

THE
BUTTERFLIES
OF THE
WEST COAST

WILLIAM GREENWOOD WRIGHT



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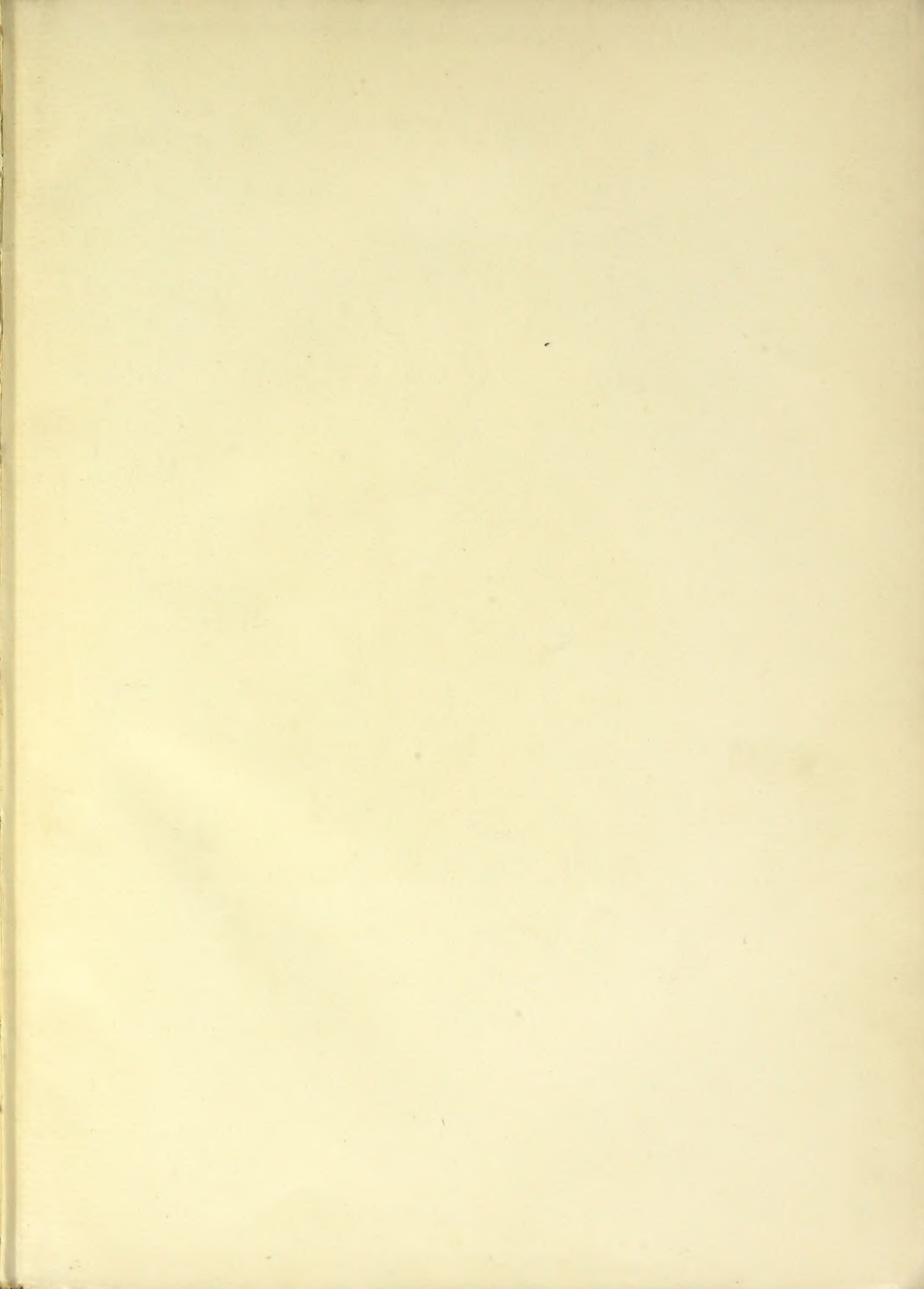
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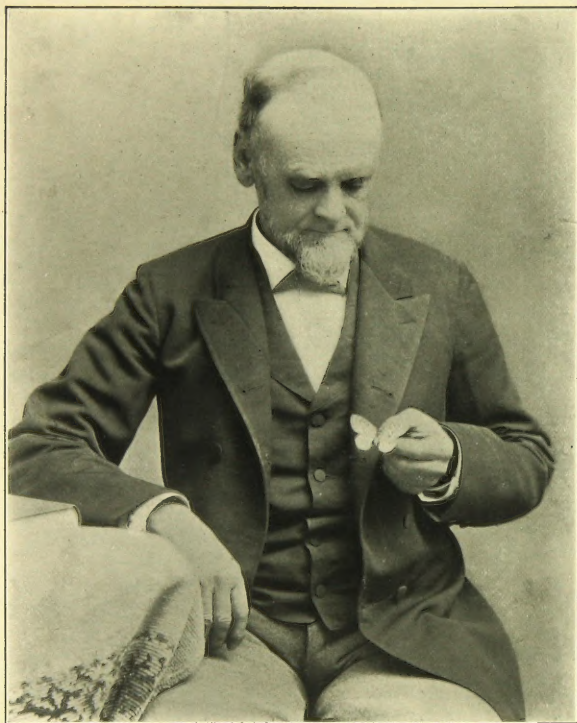
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Yours Truly
W. L. Wright.

THE BUTTERFLIES OF THE
WEST COAST
OF THE UNITED STATES

Illustrated with 940 Figures in Color-Photography of Butterflies
from the West Coast, nearly all of which were
captured by the Author, with accurate
data for each specimen

WITH COLORED FIGURES AND DESCRIPTIONS OF MANY NEW SPECIES AND
NEW VARIETIES NOW FIRST PUBLISHED

BY

WILLIAM GREENWOOD WRIGHT



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by

W. G. Wright

TO
WILLIAM H. EDWARDS

MY STEADFAST FRIEND

PREFACE

THIS book is built upon twenty-five years' work among the butterflies of the West Coast; and although a quarter of a century is a large portion of a man's life, yet the work of studying out the butterflies is but just begun. A hundred years would not suffice to finish it.

The Author regrets that the work is not more complete and more nearly perfect than it is, for it touches him more nearly than it can touch anyone else. It doubtless contains many errors and mistakes, as all the works of man must necessarily be imperfect. But nothing has been written for effect, or from fear or favor, but, first and last, and all the time, to be in the right, and to place things as future students will find to be correct.

This work is intended for the use and information of all who wish to know about the Diurnals, or Butterflies, of the West Coast, whether beginners or experts. The Author has expended much time and money and has traveled thousands of miles especially to follow up and investigate in their own habitats new or doubtful species, such as *Anthocharis Morrisoni*, *Chionobas Gigas*, and *Iduna*, the *Parnassians*, and others; and the results of such work done years ago have always been held in abeyance for the publication of this work; so that herein are contained the results of investigations made many years ago; for this book was planned twenty years ago, and everything has been conducted with that idea as a pole star, for all these years.

The Author, then, sets down these things in all seriousness, and more for the use of coming generations than for the present; believing that it will be many a long year before another man will devote twenty-five years of the best part of his life to wrestling with the butterflies of the West Coast; and believing further that the labor of all these years will result in some good for the student in years to come.

W. G. WRIGHT.

San Bernardino, Cal.,
May, 1905.

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THE BUTTERFLIES OF THE WEST COAST

GENERAL FEATURES OF BUTTERFLY LIFE

§ 1. THE WEST COAST.

In this book the West Coast is considered as including all lands west of the continental divide, the waters of which more or less directly flow into the Pacific Ocean. This region is so extensive that in square miles it might well be considered an empire in itself. As delineated on the map it covers nearly as much surface as that part of the United States east of the Mississippi River, or about 1,100,000 square miles; whereas, to the eye of the lepidopterist it is vastly larger, as the wide expanse in latitude, the influences of the ranges of high mountains, and of the arid interior desert region, all combine, each in its own peculiar way, to give variety and a larger number of species to relatively smaller territory.

The Great Basin of Nevada, Utah, and Wyoming, is as yet comparatively unknown; this interior region is rather scantily represented in this work, because, as just stated, it is a new country, and has not yet been explored; but many new and striking forms of desert life will be found there as soon as the butterfly man's net begins to wave over that wide-spreading, sandy land. But as the peculiar climate and desert environment is general, over the whole region, the fauna will also be found to be less broad and less varied than that of the more immediate coast region, of high mountains and fertile valleys, and a more varied flora.

§ 2. DISTRIBUTION BY ALTITUDE.

Increased altitude, as on mountains, has the same effect on the ornamentation of butterflies as a more northern latitude. A species which occupies both valleys and mountain heights will be found to be darker in color in those examples from the mountains than those living in the lower valleys. Take *Meganostoma*

Eurydice: In the valley the female is light lemon-yellow, and the male never has black on the hind wings, but at its upper range the female is often a greenish-yellow, especially beneath, and the male is more of a dusky-black, and sometimes has a black border to the hind wings, and thus becomes variety *Bernardino*.

In a general way, those butterflies inhabiting only the heights of mountains in the southern part of the State will be found flying at sea-level in the Puget Sound region, if they go that far north, as *Vanessa Californica*, which at the south does not come below 5,000 feet altitude. So those butterflies which live only in the low valleys of the south, and not flying far up the sides of the mountains, do not in any case go far north, as *Lemonias Virgulti*, and many others. They are tender and more tropical, and cannot stand much altitude or northing.

Some species can endure and even enjoy a great range of altitude and of northing, while others evidently cannot go far from their chosen habitat, either in the way of altitude or of northing, but just what it is that limits their range, is not known.

Then there are other kinds that inhabit high altitudes in the southern regions, and still are not found, in any circumstances, in the north. So that it is seen that each kind has its own peculiar preferences, though no one has as yet told us much about what those preferences are. Butterflies therefore are like gold: "They are where you find them," and the butterfly hunter must go where they are, and that is often in the most improbable and unexpected places.

§ 3. DISTRIBUTION AS TO LATITUDE.

On the West Coast we find that those species which are peculiarly indigenous to the immediate coast are likely to be very limited in range north and south. Yet there are some that have a wide limit in latitude. In these cases, going north, the size decreases and the colors darken and become dusky and clouded, until at length it is regarded as a different species, as, for instance, *Chryso. Helloides*, and *Dorcas*, which I regard as really but one species, but so changed by climatic environment that they must be considered as two.

The rule, as stated above as to size, has many exceptions; as, *Pieris Beckeri* is larger and finer at the north than in the south; *Anth. Stella* also suffers no diminution in size by going north.

In the distribution of butterflies as to latitude (and altitude has nearly the same effect, as I have explained,) on the West Coast, those species which are peculiarly indigenous to the immediate coast are likely to be quite local and restricted in range, and only those that are in a way continental or cosmopolitan are of wide range. To this ruling there are exceptions; among others, *Lim. Lorquini* is strictly a coast species, yet has a wide range to the north and south, flying in the mountains of Western Mexico and into Alaska I know not how far, suffering but very little darkening of color, but being much smaller in the north.

§ 4. ENVIRONMENT.

In the determination of sub-species and variations, it is necessary to call in all the side-lights that bear upon the matter: The circumstances of habitat, altitude, and season should all be fully considered. These are all carefully weighed in the determination of birds and mammals, and they should be still more carefully studied in the case of butterflies, because of the previous larval stage of the latter. It appears to me that this aspect of the matter has been largely ignored, perhaps because the writer who is discussing the matter but seldom has any knowledge whatever of the matter, and apparently cares less about these preliminary stages than their value demands. For environment has much influence on all animals, and cannot safely be ignored.

§ 5. RANGE OF BUTTERFLIES.

Range indicates the limits of flight of a species, in latitude or altitude. Butterflies, more than birds, are dependent on plants for one of the limiting causes of their range, for most species of butterflies have but one larval food-plant, while birds can feed anywhere, and can nest in any tree. The butterflies' double life of the larva and the imago, both of which stages must usually be fed, doubly limits the butterflies' range, as compared with that of birds.

Occasionally a butterfly is hardy and omnivorous enough to live almost anywhere, as *Pyrameis Cardui*, and *Vanessa Antiopa*, and consequently they are found over all the world, but such are the exception. In part, also, some butterflies do not feed at all, either on water or on the nectar of flowers, and these, as might be surmised, are the most strictly limited in range of all the varieties

of butterflies, although their larval food-plant, grasses, is wide spread.

Further, the food-plant limit is not the only limit; there is a subtler limit than that, as intimated in Sections 2 and 3, and 39; but the butterflies have not yet told me what the secret is, and I do not know, nor does any other man; but the butterflies will not fly beyond their natural limit, even where the ordinary food-plant is present, and, further, when the climate apparently offers no hindrance. On this point I will offer but one example,—the *Meliteas*, voracious feeders, all of them, which suck the nectar from many flowers, and the larvæ of which feed on many scrophularious plants, chiefly the pentstemons, and which plants grow all over the Coast States from north to south, the southern *Meliteas* do not go far north, nor do the northern *Meliteas* come far south, although to our grosser senses any limiting causes are not apparent, either in altitude, temperature, or larval food-plants.

§ 6. METROPOLIS.

In a country like the States of the West Coast,—a land of hills and valleys and mountains,—butterflies generally inhabit in the greatest numbers, first, localities where some favorite flower grows, upon the nectar of which flowers both sexes feed; second, the females are found where the proper larval food-plant grows, upon which the eggs are placed as they mature; third, the males can always be found on the bare, open hilltops, where they idly disport themselves, taking a pugnacious delight in worrying and driving off other butterflies, or in playing with those kinds with which they are at peace.

But, sometimes you will run upon a metropolis unexpectedly, and in the oddest places, and if you are hunting in a strange country you will in a moment, and unexpectedly, find yourself face to face with a metropolis, and wrestling with a flying host of the beauties which you have come so far to see. On this point I could relate some interesting stories, but this is not a story book, so I refrain.

§ 7. TYPES.

A "Type" is the specimen or specimens upon which the written description, constituting the "publication" of a species, is founded, and which carefully describes that type specimen. A species should be founded upon one male and one female specimen, of

average size and appearance; though frequently only one of the sexes is represented; those original examples then are "types," and all the others which perhaps have been compared with them, are "typicals."

The loss by fire or otherwise of a "type" is a serious and an irremediable misfortune, as it can never be replaced, and in such a case doubt will always exist as to exactly what the type may or may not have been, in color or markings. In case of types that have been reproduced by color-photography the seriousness of the matter of loss is greatly mitigated, as the colored plates will always remain in existence, for comparison, and will not fade, or become damaged by time or its inevitable vicissitudes.

Many species have been described in inexcusably brief or ambiguous language, seemingly with the intent not to tell it to anybody, but this feature of practical entomology is, thank God, fast disappearing.

§ 8. THE SPECIES IS THE FOUNDATION.

Students should bear in mind that the species is the foundation, and that the genus and family names are more or less arbitrary, the genera and the species contained in them being more or less subject to change, as they become better known, and as wiser, or less wise men set to work on them; but the specific names, as *Rutulus*, can never be changed, and you may be sure that that particular name *Rutulus* will always belong to that particular yellow, swallow-tailed butterfly, whether some one sees fit to place the name among the *Lycenas* or not. When looking up a butterfly in the index, therefore, you should always look for the specific name, rather than the genus or family name, because these latter names are found in all sorts of queer places, according to the fancy of the man who writes the list.

§ 9. SUB-SPECIES.

Much difference of opinion may legitimately exist among men as to the relative value of sub-species. In later years I have become more of a believer in the value of small differences, if they are constant, and to regard a small difference as positive and certain a thing as a wide one, and, of course, as of equal value; e. g., *Phyciodes Pascoensis*.

In varieties, where the differences grade insensibly into one another, and into the species which is supposed to be the stem or

parent of them all, these differences are varietal only, and of far less value than in sub-species, where slight differences are constant.

Breeding seems to be the only way of establishing either the one thing or the other, and I have learned by observation and by experience that breeding generally tends to establish and augment the value of sub-species, separating them, and raising them to the rank of a species, rather than to lessen the value of them and reduce them to the level of varieties.

A cent is just as certain a quantity as is a dollar; and you cannot have the larger sum without the smaller; so in butterflies, we must have the smaller values as well as the broader ones.

§ 10. VARIETIES.

A variety is a form of butterfly which varies more or less, and sometimes widely, from its supposed parent, and the differences are not constant, but grade insensibly into one another and into the parent as well, the variations apparently having been caused by some climatic environment or other cause unknown; it is then called a variety of the older or better known form or species. When the variation is extremely broad and excessive, it may lead to a form called aberration, later to be considered, as *Melitæa Mirabilis*.

I do not like the term variety, and would like to see a better system prevail, for the so-called variety may perhaps be the stem, and the older one the offshoot. For instance, *Parnassius Smintheus* was found at an early day, and thirty-four years later the form *Hermodur* was found and was named as a variety of the former; when I fully believe that *Hermodur* is the stem and *Smintheus* the variety or offshoot.

The simple fact of priority of discovery should really count for nothing. This following rule should prevail: When one particular form prevails in great numbers, is marked, constant, and free from variations, it is the stem to which that offshoot belongs which is variable, inconstant, and to which we look for all manner of queer markings. And that is just where *Hermodur* and *Smintheus* stand today.

§ 11. ABERRATION.

This term is applied to a butterfly which while easily enough placed in its genus, and which shows affinity with some certain

species, is, nevertheless, widely different in ornamentation from the typical specific form of its parents. Such a freak or sport is, I believe, of the female sex, although itself practically sexless, or at any rate, infertile; and as its race is not continued, it is scarcely entitled to a place in the list of names, because, so far as known, there never was, and never will be, another like it. Yet it is usually accorded a place in the catalogues, with a status about on a par with a variety.

It is apparent that the female sex is more liable to be found masquerading under the guise of aberration than the male; male aberrations are practically unknown. Therefore an unknown or strange female specimen should not be readily accepted as a species, but rather it should be held in abeyance till the affair clears up.

Some species are especially given to aberration; for instance, *Melitæa Hoffmanni* has many aberrations, some of which have been named and others have not, and some of them are far, far away from the type, as *Mirabilis*, in this volume. Another species which is given to aberration is *Lycæna Acmon*, several eccentric forms of which have been noted, and some of them named; e. g., *Melimonæa*, a maleless variety.

§ 12. SEASONAL FORMS.

Often, and probably, usually, the early appearing imagines are darker in markings than the later ones. The reason for this is a matter of speculation. Perhaps it is the colder nights which ordinarily prevail in the early spring, though it seems to me that this factor would have but slight influence, if any at all. And there are contradictory circumstances; as, for one, the early or cold weather forms of *Colias Eurytheme* are paler than those forms which appear in the warmer months of summer, so that the term "seasonal forms" should be taken with some caution, until the matter is followed out to its conclusion, or proved up by breeding or by experiment.

§ 13. HYBRIDS.

By "hybrids" is meant that race of butterflies that would presumably result from the pairing of butterflies of different species. Not very much has ever been written upon this subject, and that little is based altogether upon speculation, no facts bearing upon the subject having ever been printed, that I know of, the discus-

sion being merely guess-work as to the possibility or probability of any such thing ever happening, and thus, perhaps, accounting for some puzzling intergrades or variations. In this view Mr. W. H. Edwards has written a few sentences, but as nothing was positively known, no conclusions were reached; and H. Edwards, in 1876, described a butterfly which was thought to be a hybrid between *Atalanta* and *Carye*, but, as before, nothing was positively known. But the opinion has always been advanced that the progeny, if any there were, would be infertile, and so disappear, in the next generation, if not in this.

And now let us have a couple of facts upon which to base conclusions. In 1895 I observed a pair of *Theclas* in copula. As is usual in such cases, they were flying heavily, one flying away with the other, and soon they alighted; upon taking them I found the male to be *Dumetorum*, and the female was *Iroides*. Again, in 1902, I saw a pair of *Pierids* similarly attached; they were captured, and immediately mounted; the male is *Rapæ*, and the female is *Protodice*. Thus in seven years I have captured two pairs mismated, in full copulation, and the fact that such mismatings can and do occur is fully established. During the same seven years I have taken in copula perhaps twenty pairs each year, regularly mated.

At that estimate one pair in 140 is regularly mismated, or irregularly mated; at which rate, out of a thousand matings seven would be irregular. Now, if that per cent be normal and continuous, we see at once that there can be no resulting fertile progeny from the mismatings, for if there were intergraded varieties following every mismating, the world would be full of hit-and-miss butterflies in a few years. It therefore appears conclusive that, as in other lines of the animal kingdom, the mismatings must be infertile, either immediately or in the next generation. This is one of those cases that can be proved only by the breeding of the egg and the larvæ of this year and of next year also, and those difficulties that stand in the way of such breeding are so many and so great that it is safe to say it will be many a decade before it is accomplished; and he who has bred butterflies knows this very well.

§ 14. DIMORPHISM.

Is a name given to white or black females, which in general color differ totally from their normal-colored sisters. In *Colias*,

the dimorphic female is white; in *Argynnis* she is black; with this provision noted that where the black female is found, there is no normal-colored female at all. Whether there ever was a normal-colored female in these cases, no one knows. I believe, however, that at one time the normal-colored female existed, and that she has disappeared, just as at the present time the normal female of *Colias* is being replaced by the albino, so that in a few decades, a yellow-colored female will be difficult to find, if the present rate of change shall be kept up.

In *Colias*, at any rate, if one can build upon twenty-five years' observation, the orange-yellow female will shortly be difficult to find, or will have been entirely supplanted by the white, so that, like *Argynnis Nokomis*, *Nitocris*, and *Leto*, there will be no normal yellow female *Colias* at all.

§ 15. ALBINISM.

This term is applied to the dimorphic, or secondary, white females, as of *Colias*, many examples of which are illustrated herewith. But one example of a white or albino male is recorded, that one being the male of *Philodice*, from Western New York, taken in the summer of 1891, and noted by the veteran butterfly captain, W. H. Edwards. *Philodice* is considered to be the Eastern form or representative of our Western *Eurytheme*. No other white male or albino has ever been noticed anywhere, and but for the faith that the name of such a man as W. H. Edwards compels, I should disbelieve the statement of the existence of a male albino.

§ 16. BISEXUAL.

Is a term applied to such butterflies as have on the right-hand the wings of one sex, and on the left-hand the wings of the other sex. This variation appears to occur occasionally, everywhere. The only specimen ever taken by me was a *Lycana Piasus*, and which is figured on Plate XXX, in this book. I have also heard of a *Lycana Sonorensis* so marked, also taken in Southern California. Examples of bisexuals are illustrated in Edwards's Butterflies of North America.

Bisexual individuals appear to be infertile, like the hybrids and other mules; it is not known whether they are of one sex or of the other, or neither. No fact is known, upon which a theory may be based, except the single one, that such butterflies are occasion-

ally found, and not alone among the little ones, like the *Lycænas* mentioned, but also among the larger kinds, like *Papilio*, this curious mix-up of the sexual ornamentation has been found.

§ 17. SEX-MARKS.

About half of the species of butterflies are readily determined as to sex, at a glance, by some obvious differences, such as the anal claspers, or the different pattern of ornamentation of the wings; but there are others, especially among the *Nymphalidæ*, which are difficult to determine. In these cases the "lappets," or the aborted fore legs which are folded over the prothorax, usually afford a good point; the lappets of the males are fully clad with plenty of long hairs, while the lappets of the females are less fully clad in shorter and scanty hairs.

The beginner is often puzzled to determine the sex of a specimen which later he would quickly know, as he became more familiar with the complexion of butterflies in general. When the butterflies are freshly emerged, and are unfed, and immature, the sexes are more difficult of determination than later, when the bodies of the females are developed and mature.

§ 18. GREGARIOUS BUTTERFLIES.

One species of butterflies, *Danaïs Plexippus*, is at times gregarious; they gather together in thousands, alighting thickly together in one tree, or at least as near together as possible. I have noted these gatherings in spring and in the fall; on the shore of the Pacific, near Los Angeles, and in Texas, and they have been noted in other parts of the country, by other persons. These gatherings are peculiar to this one species of butterfly; no other species has any similar habit. When the conclave is disturbed in any way they arise in multitudes, and fly about in a confused, uncertain way, and at length settle down again as closely as before. Many writers have noted these gatherings, but no one has offered any plausible reason for the funny proceeding. They do not appear to have any leader, nor to have any especial business to transact, or to be engaged in any social pleasures; but just to get together,—only this, and nothing more.

§ 19. FREEZING.

Butterflies can and do endure a freezing temperature without suffering therefrom. In the high, alpine meadows of the Sierra

Nevadas I have seen the delicate little *Lycænas*, *Acmon* and *Dædalus* clinging to grass stems in the cold frosty mornings when everything was stiff and white with frost, and large icicles hung from the water troughs. I apprehend that the juice of their bodies is so constituted that it does not freeze readily. At any rate I know that they do endure freezing temperature, and that they are not apparently injured by it. I have never heard of any person trying to freeze a butterfly, but the feeding of the larvæ, and the keeping of the chrysalides in cold storage, as on ice, has often been tried; the only effect being to darken the resulting butterflies.

§ 20. NON-FEEDING SPECIES.

The *Satyridæ*, which seldom or never feed on flowers, or take water, and whose individual lives are, therefore, short, are weak of flight, and the butterflies themselves are seemingly lacking in enterprise and vigor; they do not wander far from the place where they were born. They spend their lives in laziness and indolence, caring for nothing but to mate, and die. Why, then, have they the apparatus for eating, if they do not use it?

Some moths of the West Coast, both of the day-flying and of the night-flying kinds, which do not feed on flowers, are aborted in the usual feeding mouth-parts, having no proboscis or tongue, presumably because they do not need to feed, or have neglected to feed for so long a time that their feeding apparatus has become atrophied or aborted, so that now they cannot feed if they would. The query is, why, then, are not the similar organs of these non-feeding butterflies also atrophied? Are butterflies a more recent creation than moths? And will the feeding organs in these non-feeding butterflies in like manner become useless and aborted, in time? If so, then these *Satyrids* will be the first among butterflies to become tongueless, as they are now in some other respects the most degraded and mothlike.

§ 21. FOUR-FOOTED BUTTERFLIES.

About half of the genera of butterflies are six-footed, and the rest of them are four-footed; twenty-three genera are six-footed and twenty-seven are four-footed. Commencing with the genus *Heliconia* all are four-footed up to and including *Libythea*, and the rest are six-footed. By this is meant that the feet are or are not adapted for walking; all of the so-called four-footed ones have

the fore legs in part, but the tarsus or hand is wanting, so that the fore legs are useless for walking, and are merely folded over the front of the thorax, and are called "lappets."

These lappets are useful in the determination of the sexes of the butterflies, the males having lappets that are more completely clad with long and dense hairs, and the females having lappets that are scantily clad. Many of the four-footed butterflies are very similar in appearance, as to the sexes, and the determination would be difficult but for the lappets.

The fact that a butterfly has six feet or only four is not deemed of much importance, and does not count for anything in the classification of them; in fact, one species exists wherein the one sex has six feet and the other but four.

§ 22. AT WATER.

Soon after a butterfly emerges from its chrysalis, in its habitat on the plains or in the mountains, curiously enough it seeks water to drink. Both sexes are found "at water," as it is called, but the males are in greater proportion than the females. True, as we all know, there are, as a rule, many more males than females, at all times and all places, but it seems that but a small proportion of the females, at any and all times, are to be found at water. When butterflies are seen at water, on damp places in the road or at sandy places by the brookside, they are always fresh and bright, and are so busily engaged that they are easily taken in the net. They have a habit of gregariousness, or of flocking together at water, so that there will be dozens or even hundreds gathered together in a bunch, as thick as they can stand, all absorbed in sucking water from the damp sand. Different, and widely separated species and genera are thus drawn together; *Papilios* and *Lycænas*, *Vanessans* and *Melitæas*,—the more the merrier.

It would seem that these watering places might be good places to catch a supply for the cabinet; obviously so, but the trouble is that always the females are the ones that are wanted, as males are plenty enough at all times and places. The reason that the females are so generally absent from the watering places, is, I believe, because they are more inclined to feed on flowers. They have to sustain and perfect their brood of eggs, and so require more nourishment than do the males, and no real nourishment can be found in water, while the nectar of flowers affords food and water together.

§ 23. AT NIGHT.

It is curious to note that when butterflies go to rest at night they seem to have "a thought for the morrow," for, instead of choosing a place in the warm sunshine of the afternoon, as would seem to be the natural way, they select a place—by instinct, it must be—where the warm sunshine of the morning will first come; they seem to know that while the warmth of the sun at evening may be agreeable to go to sleep by, the morning will be cold, and the sunshine still more necessary to them than it is at evening. I have noticed also that they often choose a dry bush rather than a green one, for their sleeping place; probably they instinctively know that the dry one will be less damp and consequently warmer than the green one, through the hours of darkness.

§ 24. TAMING BUTTERFLIES.

Butterflies are easily tamed, and like birds, appear to enjoy the pleasures of captivity, and yet, again, like birds, they are always listening for the call of the wild, and the invitation of the open door is never in vain.

A day or two will suffice to tame a butterfly so that when it sees you coming it will walk towards you, waving its wings in pleasure at your appearance, and gently unrolling its tongue as it walks along, in anticipation of a sip of sweetened water; then it will climb upon your finger, all the time waving its great wings as if it knew they were very handsome indeed, and feeling with its tongue for the expected dainty.

The dominating taming influence with butterflies, as also with bird, and beast, and man, is—hunger. You must always approach the butterfly with gentle motions, with an absence of anything new or strange or unexpected or unpleasant, when it is hungry, and with food on your finger tips, and when you call it you must each time do so with the same motions and the same tone of voice. The females are more tractable and teachable than the males.

§ 25. LENGTH OF A BUTTERFLY'S LIFE.

This is largely dependent upon its habits and its native vigor. Some kinds that are stout of body, and which feed abundantly upon flowers, will live several months, and these will occasionally live over winter, if in some sheltered and wooded canyon where

they can find cover from the cold winds and the rains. The *Graptas*, *Vanessans*, and *Pyrameis* are the most notable examples of this group, the long-lived species. Intermediate species, like *Argynnis*, and *Melitæa*, have a life of several weeks, or possibly two months' duration. The *Satyridæ* are generally non-feeding, are seldom or never seen feeding on flowers, or on the damp ground taking water. They are slender in build of body, and sluggish and lazy in habit, and the individual life of these non-feeding kinds is, therefore, necessarily short, because they have not a supply of nutriment in their scanty bodies to enable them to withstand the stress of time and weather; and their brief lease of life is occupied solely in the business of propagation of their kind. For instance: the annual flight of *Chionobas Iduna* is begun and ended inside of ten days. One year I was able to stay with them and to make particular note of their comings and goings, being on the ground before the first one appeared, and remaining till the last one had disappeared; and seven days saw the first and the last of that year's flight.

§ 26. ULTIMATE FATE OF BUTTERFLIES.

The logical and natural end of a butterfly's life is that it becomes benumbed by cold, or in some way is disabled and falls to the ground and is seized upon by the ever-present ant and eaten up alive by that poison-fanged tiger. That such an innocent and happy creature should meet with such a fate, the most terrible and deplorable that we can conceive of, is sad, indeed, but such is the inexorable law of Nature. The collector, therefore, who catches his butterfly and mercifully kills it, and gives it a place in his cabinet, gives it thereby a relative immortality, and it lives in some one's museum for many years. Is not this relatively a happy and a useful ending of its life?

§ 27. RUBBING THE WINGS.

Theclas and *Lycænas* have a curious habit when at rest, or when feeding on flowers, of rubbing their wings together with a gentle, even motion, which recalls to the observer the habit which houseflies have of rubbing their hind feet together. The wings I think do not ever touch together during this rubbing process, and what can be the use or object of the rubbing motion is a mystery. I have never seen any reasonable explanation of this curious habit offered by any one. No other kind of butterfly

behaves in this singular manner, but those named are sure to act that way when they are not asleep.

§ 28. WINGS OPENED OUT FLAT.

Many butterflies have a habit of alighting upon the ground and opening out the wings flat, with their backs to the sun; this is more noticeable in the cool of the morning and toward evening. Or in the case of skippers, they open out the hind wings only, leaving the fore wings upright as usual. This opening of the wings is for warmth, only; they never do it when the weather is warm enough for them to be comfortable; though of course, not all kinds have the same requirement; a tropical species will want the heat of the sun when a colder one will not. On the West Coast the species most given to warming his back in the sun's rays, is *Pyrameis Carye*.

§ 29. AT REST.

Butterflies have been classified into two groups: The "true butterflies," which always carry all wings upright or back to back when at rest, and the "skippers," which usually carry the hind wings horizontal when at rest. This classification is subject to correction and amendment in relation to the West Coast butterflies, for not all the large, "true" butterflies carry their wings upright; for example, *Bredowi*, *Lorquini*, and *Iduna* usually carry all their wings flat when at rest, and *Papilios* frequently do; while not all the skippers carry their hind wings flat, and some of them never do.

This foregoing classification of upright wings is in contra-distinction to the nocturnal-flying lepidoptera or moths, the wings of which are usually carried flat, or sloping both ways, like the roof of a house.

§ 30. MIMICRY, OR SIMULATION.

A good deal has been written about coloration, or the lack of it, as a means of protection to butterflies, and of mimicry, or that one species simulates some other object or thing for their better protection from birds, or from the attacks of other supposed enemies. The most of this talk is mere guesswork and speculation, indulged in by writers in order to show up the wisdom of Nature to those less wise than themselves. I do not believe a word of this mimicry theory: in general terms I know it to be false.

The worldly rule, to eat and be eaten, applies to butterflies as well as to all other animate things. But butterflies have not the instinct of fear; they are happy in the absence of a knowledge of what fear is, and they are happy in the possession of a power to avoid their enemies by rapid flight. If you strike your net at one and miss it, you alarm it, and it flies rapidly away, but it soon stops to feed on a flower, or to flirt with a mate, without once looking back to see if you are following it, for it has forgotten you.

Having no fear, they would not use mimicry, if they had it. Butterflies are able to take care of themselves. During twenty-five years' butterfly work I have seen but one attempt of a bird to catch a butterfly; then it was a flycatcher bird chasing a *Colias*, dashing after it many times, until, tired out, it stopped, and the *Colias* escaped. But shall we assume that the butterflies of that region, remembering that attack, will eventually develop simulating devices on their yellow wings? It is absurd. As it escaped, it might more reasonably be expected the *Colias* would adopt still more flaunting colors, to commemorate the victory, if they had anything to do about it, which they have not.

Some butterflies habitually alight upon places that are concolorous with themselves; most of the *Satyridae* do this. Take *Chionobas Gigas*; its only alighting place is the bare gray rock, upon which only a gray moss grows, the moss interspersed with patches of lichen covered rock; and when it alights on such a place you cannot distinguish it although you saw it alight only three yards away. He alighted there, but not from fear, and not to secrete himself by virtue of mimicry, for he is only playing, and he dashes out to attack, or to play with, the first butterfly that comes in sight of his rock. Some *Satyrids*, weak of flight and stupid of habit, adopt as a means of escape from attack, that familiar ruse, called simulation of death; they become apparently lifeless, and drop into the grass or rubbish, and remain motionless; but that is a ruse common to many of the smaller forms of animal life, and is not mimicry.

If a large proportion of the species of butterflies mimicked anything, then the rule or the proposition would stand some chance to hold good, in some degree at least, but not one species in a hundred can be said to mimic or simulate anything. The idea, therefore, that butterflies simulate leaves or sticks or stones, as a means of protection from their enemies, is evidently unten-

able. If it were necessary for one it would be so for all. On the contrary, butterflies are generally distinctly and brightly colored, and in their habits they delight to flaunt their glittering wings in the face of the world. They fear nothing; and if attacked they know how to escape.

As to birds, note that they are in perpetual fear for every moment of their waking lives; not for one instant are they free from caution as against their enemies; it seems as if they wanted and needed eyes that should look backwards and sideways as well as forwards, for they are always trying to see in every direction at once; why, then, are not birds protected by mimicry, for they really seem to need it; but butterflies do not need it.

§ 31. MOVEMENT OF BUTTERFLIES.

By "movement" I mean the substitution of the abnormal female for the normal; the temporary or permanent disappearance of an entire species; and the unaccountable appearance of lost or unknown species; in fine, the change from one state of things to another state.

Where, now, are the normal-colored females of *Argynnis Nitocris*, *Nokomis*, *Leto*? They are not in existence anywhere, but, occupying their places are dimorphic or melanic females, wholly dissimilar from what the normal females should be.

Observe *Colias Eurytheme*, and all of those species of *Colias* that have an albino female. Like the males of the *Argynnids* just mentioned the males are constant, there is no dimorphism in that sex, but there are two females existing, the normal yellow, and the white or albinic; the latter increasing rapidly in proportion of numbers as the years go by, until apparently it will be but a few decades, or a few hundred years at most, when those species of *Colias* will have no normal yellow colored females in existence. Twenty-five years ago in California the albinic females of *Eurytheme* were extremely rare; but today they are common. The same report also comes from Colorado. It has been suggested that perhaps the increasing growth and use of alfalfa, (*Medicago sativa*, a plant not a native of America but introduced from Europe,) upon which plant the larvæ of *Colias* now chiefly feed, but upon which in former times they could not feed, is, to a greater or less extent, the cause of the dimorphic change; but I do not see any weight in this suggestion.

As to the disappearance of species, I will cite cases: *Lycæna Tejua*, found in Southern California some thirty-five years ago, was presumably common then, as it was taken cursorily or accidentally, and in those days a butterfly hunter was very rare indeed; but since then it has never been taken, it has utterly disappeared. *Lycæna Xerces* was fairly common in the early days of California, being found in Lone Mountain Cemetery on the outskirts of San Francisco, but about thirty years ago it disappeared, and for about twenty-five years was not seen, though diligently sought by experienced men, and has been accounted extinct by some writers; but it is now again found in the same place as formerly. Of *Pamphila Melane* three specimens only were taken thirty years ago, accidentally, and was thereafter quite unknown until rediscovered by me, seventeen years after its disappearance, since which time it has become quite common everywhere over the southern half of the State. Notwithstanding the more active collecting in recent years as compared with the years when the following species were found, *Chionobas Nevadensis*, *Satyrus Wheeleri*, and *Mechanitis Californica* have become unknown, and are apparently extinct.

On the other hand, many new forms are noted from time to time, some of which, by all parity of reasoning, should have been discovered long ago. *Copæodes Candida* was first taken in a favorite hunting place frequented by me for years previous to the date of actual capture, its food plant having just become introduced into the country from the Gulf States; but, though the plant came from the Southern States the butterfly itself did not come from that country, but apparently the butterfly could not appear till its proper food plant was ready for it; and even then its introduction was very gradual, for it was seven years after the capture of the first specimen before I got a satisfactory series of specimens upon which to base a new specific name, although its novelty was noted when the first one was taken. The particulars of the discovery of other new species in old and well-known fields, where the butterfly net had been swinging for many years, can be found in the body of this book.

About eighty plants have been noted as having been introduced into California since the coming of the white man; most of them have come as weeds, or have introduced themselves and now are wild and able to take care of themselves. And it is reasonable to

believe that some species of butterflies have become established in this region, as a result of the increased variety of plants now living here.

But whatever the reason may be, the fact remains; species come and go, forms prevail, and in time disappear; apparently but few things stand immovable. Perhaps for a century or two the movement in most species is not observed, and yet, again, other species move with great relative speed, until, for one, I am on the verge of belief that in a thousand years, or in ten thousand (for a few years more or less do not count), the changes in the butterflies of the West Coast will be very great indeed. How or why the changes come can be told only after much study and observation through many years. Certainly, one man, or one generation of men stands no chance of solving the question. The most that we can do is to note down the things as we find them; and an aggregation of these notes after a series of years will afford a distinct step forward in the investigation.

§ 32. DRY AND WET SEASONS.

When extremely unfavorable dry seasons occur, as in 1883, and 1898, birds will not nest, or perhaps will build nests but lay no eggs in them; bees will not swarm; and butterflies do not properly appear. It is not well known what becomes of the butterfly nation in those bad years. Of course, there are many butterflies on the wing, but some kinds do not appear at all, and other kinds are very few in numbers. They must tide over the dry season, in chrysalis, or die. And I think that in good part, they die.

I have known that sturdy and vigorous butterfly *Papilio Zolicaon* to be almost wiped out by a bad and rainy time when they were just at the point of emergence. I was then engaged in getting material for the illustration of *Zolicaon* for Edwards' Butterflies of North America, and had in previous years secured most of the required material, when a wet spring came on, and it rained every day more or less for forty days; and *Zolicaon* did not appear at all that year, and it was several years before they came in from the outside, so to speak, so that I could supply the lacking material. This is the reason that a hiatus of seven years appears in Edwards' history of the species, and in the illustrations thereof; a hiatus never before explained.

§ 33. FOOD-PLANTS.

To many species of butterflies mentioned in this book, "The Food-Plants" are noted down in the body of the work, as ascertained by myself and also by many other observers, since the study of butterflies began; but the student must not think that these lists of names of plants are complete, and that there are no other plants used as larval food-plants besides these as noted; on the other hand there are many caterpillars that are well-nigh omnivorous, and will eat almost any green thing rather than starve. Yet it is true that a majority of caterpillars will only eat the leaves of one particular plant, or at best, only the leaves of one group of plants, as the Pentstemons. Other larvæ feed on the immature seeds of leguminous plants; and still others feed on the pith of some flower-stem; and one kind live in the interior of a succulent, juicy leaf.

Probably a majority of the species of larvæ are unknown as to their food-plants. To discover these plants, and to get eggs, and rear the larvæ through to pupation and to emergence, will furnish employment for the working butterfly man of coming generations, for many years. And the doing of these things will settle many things, and many a disputed point, as nothing else will, as for instance, the status or value of many so-called varieties and sub-species.

§ 34. THE ARMY WORM.

The so-called "army worm" is composed chiefly of the larvæ of moths, and not of those of butterflies. But when the army worm appears the season is certain to be a favorable one for butterflies, as well as for moths; and if a drag-net be drawn it will be sure to catch numbers of the larvæ of butterflies, along with those of moths. For many of the butterfly larvæ are largely omnivorous, and will eat the leaves of most cultivated plants and grasses. *Pyrameis Cardui*, *P. Carye* and *Colias Eurytheme* are the chief sinners, being everywhere abundant, and the larvæ are practically omnivorous, so that the larvæ of those species are oftenest caught in the company of the army worm proper, and so receive undue blame.

Moths are almost always nocturnal, they fly by night, and the caterpillars feed mostly by night and are, therefore, but seldom seen, so that they escape notice, ordinarily, and the blame falls

upon the diurnal butterflies which are seen, although they are not the chief offenders. But when the army worm appears, and prevails, they both appear to forget their proper habits in the mad rush for a fresh green leaf.

§ 35. GETTING BUTTERFLY EGGS FOR BREEDING.

It is generally understood that to get eggs from the female butterfly, the insect must be confined in a gauze bag along with the proper larval food-plant, and that if all things are favorable, she will lay her eggs, one by one, as they mature, upon the leaves of the plant. This is generally true; but the matter can be greatly simplified, as nearly half of the species do not require that the larval food-plant be present at all. Females of the following named genera will lay their eggs upon anything, even on the net itself, if other matters, as proper shade, warmth, air, and quiet, are agreeable to her: *Parnassius*, *Argynnis*, *Euptoieta*, *Neonympha*, all the genera of the family *Satyridae*, and in part, some other genera. All the rest require their own peculiar larval food-plant to be present, and the females will die rather than oviposit without it. And it is necessary that the plant should be fresh and bright, as the butterfly will not oviposit on a plant that is at all wilted.

When out in the open fields the best way is to tie the gauze bag upon a twig of the living plant, and then put the female in it, and tie it up tight, and leave it in quiet; a little shade will be necessary if the sunshine is bright. Guard against ants, for they will gladly kill and eat the butterfly; look out also for birds, and for boys. A small bag is better than a very large one. All butterfly eggs are a little sticky at first, and will adhere to any object upon which they may be placed by the female butterfly; but it is best to have the bag of a fine mesh, so that the eggs cannot fall through and be lost, if dislodged.

You can carry the mature butterfly a long distance, if she is put into a can, as a baking powder can, and shut up in the darkness. I once carried a female *Leto* 800 miles, in five and a half days, and after that heart-breaking journey she gave me a fine lot of fertile eggs. Another plan, and a good one, is to take the butterfly home in the tin can, and take a glass fruit jar of one or two quarts capacity, and put in the jar some fresh twigs of the proper plant, and then put the butterfly in, and close it up tight; the seal-

ing of the jar will keep the twig from wilting, and the stillness and quiet are agreeable to the butterfly, and conduce to success. If the butterfly is of the kind which require no plant, the same processes are available, with the added facility of not having to bother about the plant. You can catch the butterfly in the most distant mountains, and bring her home, and putting her in the jar, get the eggs, with but little trouble, after you have become acquainted with the little wrinkles of the process, although you may live in the heart of a city. A proper amount of sunshine and shade, of proper warmth, of utter quiet, are obligatory in any case.

§ 36. BREEDING THE LARVÆ.

Butterfly eggs hatch in from ten to twenty days, according to the species. The caterpillar is at first but a small thing; really, if it is of a very small butterfly it will be nearly invisible to the unaided eye; the first thing the larva is likely to do is to eat its own egg-shell, then after a while it wants to nibble at a leaf. All this time it should be in the jar, as previously mentioned, as it is otherwise likely to be lost. Young and tender leaves must be given it every day, and after a week or two the jar must be washed out daily, and so kept clean and sweet, as otherwise the larva will die.

When the caterpillar has lived its appointed days, and gone through its proper moults, it has arrived at maturity, and becomes sluggish and stupid and ceases to feed; but shortly it begins to creep about, and if it is not carefully caged it will get away and be lost; to get away it will gnaw through cloth, and sometimes they will go into the ground, and so become lost to you; when the wandering stage is over it will attach itself to a twig, and in two days will have become a chrysalis.

In the pupa or chrysalis state it may remain for ten to twenty days, or longer, perhaps all winter, according to circumstances. And when the proper time has come it will emerge, a bright new butterfly. At first it cannot fly, for its wings are as soft and limp as a bit of wet tissue paper, but after a while the wings become firmer, and soon it can fly, and you have a "bred" butterfly.

§ 37. BREEDING IN DARKNESS AND IN COLD.

When caterpillars are bred or raised in darkness from egg to imago, the resulting imago will be darker in color than the nor-

mal; the dark spots and lines will be broader and more dense or dusky, and the lighter ones will be sordid or dusky. But no excessive variation or deviation from the plan of the normal form has ever been noticed, although the effort has many and many times been made to create new forms by this method.

So, also, by cold. Caterpillars raised in an ice-house, or in cold-storage, where the temperature is kept down as low as possible, will never develop any radical variation, but the butterflies will be darker than they would have been if raised in a normal temperature.

§ 38. MIGRATION OF BUTTERFLIES.

At times a so-called migration of a certain butterfly occurs, when, for days together the air will be filled with millions of individuals of one species, all flying in the same direction, and apparently never stopping to rest or to feed on flowers. These migrations sometimes extend over a large territory, and continue for a week or more. But little is known about them, really nothing, in fact; and as to what the inducement is, or what the gain, nothing is known, or even surmised. The flights are not always in the same direction, though generally to the northward. I have witnessed several such migrations, and all of the butterflies were of the same kind, *Pyrameis Cardui*. One day, upon the top of Grayback, at the altitude of 11,600 feet I encountered a migration when the direction taken by the butterflies was due east; they came flying along up the slope of the mountain, a yard or two above the ground, all going at the same rate of speed, say, six or seven miles an hour, and upon reaching the top of the mountain, where the crest dropped suddenly, instead of dropping down upon the precipitous descent on the eastern side of the mountain, as might have been expected, they kept straight on as far as the eye could follow them, right up into the sky, and toward the moon, then in full view in the eastern sky.

In 1901, in May, a grand migration of *Cardui* occurred in southern California, which lasted eleven days, and covered the whole southwestern part of the State. In this case the butterflies came up from Lower California, as I learned from correspondents in that part of the country, and in the months following, the region of Canada just north of the American line and east of the Rocky Mountains, was reported to be full of *Cardui*,—that they

were everywhere, doing nothing, "just flying about and feeding on flowers," and the residents were said to be apprehensive of the "army worm," but I never heard that the army really did appear. This migration, then, was over a known distance of about twenty degrees of latitude, or, say, 1,400 miles. The rate of flight I estimated at eight miles an hour, which would require one hundred and seventy-five hours' actual flight for the journey; but as they could not fly more than eight hours a day, seventeen days' travel would be required from Mexico across the United States to Canada. It is quite possible, however, that the Mexican butterflies may, many of them, have stopped in the States, and others from the States have taken their places in the grand march for the north.

§ 39. STRANDED BUTTERFLIES.

This term is by some writers applied to such species as inhabit the tops of high mountains and not the intervening plains or valleys; they are said to be stranded, being confined to those peaks, and presumably not being able to cross over the warmer valleys. For instance, *Semideia* is said to be "stranded" on the tops of the White Mountains of New England; *Gigas* may, therefore, be said to be stranded on the bare rock knobs of Vancouver Island, and *Ivallda*, and *Indra*, on the alpine peaks of the Sierra Nevada, and so on, because they probably do not pass from one to another of such heights, and do not live in the intervening valleys; having become inhabitants of these inhospitable localities during some previous and colder climatic era, they are now apparently on the verge of extinction, if the climate should, perchance, become yet more moderate than it now is.

This opinion I do not share. Such butterflies live on these high, inhospitable localities simply from choice. If they see but one sunny hour during the week of fog and rain and gale, that one hour is sufficient; they do not feed on flowers, therefore why should they care for them? Their sole business is to mate and to oviposit their eggs on the fine alpine grasses that grow in the crevices of the rocks, and they then die, having lived their appointed lives in the places they like best. Reverse the case: the butterfly which lives in the warm valleys only, is it "stranded" there, and is it liable to extinction when a cold cycle occurs? Oh, no. Neither is the alpine butterfly stranded. The cold, barren

peak may seem inhospitable to us, but it is not so to them, it is home, and they love their alpine home just as dearly and as consistently as the inhabitants of the fertile plains and of the tropical riversides love theirs.

§ 40. CAPITALIZATION OF NAMES.

"All proper names should be capitalized." The author believes in this rule of grammar, and in the propriety of a capital letter, in all cases, whether the name be founded on a person's name or not. All specific and varietal names in this book are, therefore, capitalized.

§ 41. GENERIC NAMES OMITTED.

As in the matter of omitting authors' names, mentioned in a following paragraph, so, too, largely, as to the mention of generic names in the discussion of species, the genus name may well be omitted for the sake of brevity, and to avoid repetition. It is almost unknown that the same specific name appears in more than one genus, and, therefore, the mention of the specific name is sufficient, without the continual repetition of the genus name.

The species name is the foundation. Originally, the genus name was based upon the venation of the wing, but even as to that base no two modern writers agree, in all cases, so that the genus name has not the value that it once had, but is become a matter of doubt and comparative inconsequence.

§ 42. AUTHORS' NAMES OMITTED.

It is customary in scientific works, in discussing species, to carefully mention the author's name, thus: *Agraulis Vanilla*, Linn., as though more than one author had proposed that name for that species and, therefore, mention of that particular author's name must be made, for the proper identification of the species. This is mostly unnecessary and superfluous. There are not half a dozen instances in the whole list where a specific name requires the addition of the author's name for its identification.

The study of the butterflies is the essential point, and it is entirely of secondary importance who the author of any one species may have been. Names are given primarily to distinguish and identify different forms, and not for the identification of the author. In the Complete List I have given the authors' names, for the use of those who care for them for further study, but else-

where such names are omitted, as being superfluous, the repeated mention of them serving no good purpose.

§ 43. NOMENCLATURE, AND SEQUENCE OF GENERA.

In the names of the genera, and the sequence of them I have in this work followed pretty closely the classification of W. H. Edwards, whom I consider by all odds the great butterfly captain of his century, and his arrangement of them as sound and conservative, and based on a rock. I have, therefore, followed his lead, and ignored the chaotic efforts of some later writers, in the invention or adoption of new names, and in the changing about of old names from one genus to another, as well as in the unnecessary and baseless sub-division of genera, and the general overturning of anything like order. I see no use or benefit in changing an old and accepted name for a new one, or in dividing a moderate sized genus into many; it is too much like the child's puerile play of piling up blocks or cards and knocking them down, just for the pleasure of piling them up again. Science gains nothing thereby; knowledge is not increased, nor made more attractive or accessible; but rather the contrary, it is obscured and covered up, and the student is discouraged and disgusted. Moreover, no two of the iconoclasts can agree among themselves, but each heartily contemns the efforts of the other.

In other branches of Natural Science, as in botany, or coleoptera, a genus may contain fifty or more specific names, and no one complains; whereas, in diurnals, the genera usually contain but a few names, and only one genus has ever any ways approached the number of fifty. Edwards' system I, therefore, consider sound and sensible, and I follow it, with but few and minor alterations.

§ 44. ALL FORMS NAMED.

Names are given to butterflies to distinguish one form from another; they have no other use. Therefore all distinct forms should have distinctive names, but whether such names be specific, varietal, or provisional, is of little moment, just now, at any rate. But it is essential that every different form shall have a name that belongs to it alone, and by which name it shall be known and recognized, whether this author, himself, may happen to have one specimen only, or a thousand. For, although any one form may be rarely met with today, it may be common tomorrow, or may be common today in some other place.

A name, or the lack of it never makes or unmakes a species or a variety. If a certain butterfly is a species, it will continue to be a species through the ages to come, whether you, or I, or the next man may consider it so or not. Butterflies have a way of doing as Nature teaches them, and the best that man can do is to accommodate himself to the facts of the case, and not try to make the butterflies fit themselves to his own peculiar opinions or wishes. Some men known possibly to this generation have come to grief and ridicule by not heeding this precept. On the other hand, a fact will stand, whether the first statement of it be believed or not: "Time at last sets all things even." And on this rock have I built this book.

§ 45. COLLECTING BUTTERFLIES.

The tools and appliances required may be rough and crude, or elaborate and complete, according to the amount of work proposed. The best are the cheapest, in this pursuit, as in other things. But, whether crude or elaborate, taste, and a dainty handling are imperative. And a plenty of these will overcome many deficiencies in the apparatus.

The net-ring can be made of wire; brass wire, of spring temper, is best, as it can be reinforced or strengthened by soldering on a stiffening near the handle; this reinforce should be first fastened to the ring-wire by wrapping with brass or copper wire of thread-like size, and then soldering the whole together. The ring should be in diameter about 12 or 15 inches; smaller for *Lycænas* and other small species of gentle flight, and larger, up to 20 inches, for large and wide-flying species that have to be taken on the wing, like most *Papilios*.

The net may be made of mosquito-bar, but is not satisfactory, and lasts but a short time. Wash-blondé, a wide-woven, lace-like goods of finer texture and a cell-like mesh, gives best satisfaction, and is reliable, and will wear a long time. Make the net deep, or long enough to securely retain the butterflies when they are once caught, say, two feet deep for a small net, and three feet deep for a large one, or about twice as long as the ring is wide. Do not run the net down to a point at the bottom, like a V, but rather let it have the shape of a U, and make it large enough at the top that it may gather, or pucker a little as it is sewed on to the ring, because it soon stretches with use, and if not gathered

on the ring it contracts near the ring, and many of the smartest butterflies will escape.

A staff or handle can be made from the butt of a fishing rod, or from any stout and flexible wood. It must be provided with a good ferrule, or it will split.

For a killing-bottle, any short and wide-mouthed bottle may be used. Fit in it a deep cork, loosely. With your pen-knife dig a cavity into the small end of the cork, and put in a piece of cyanide crystal as large as a pea (bearing in mind that it is a deadly poison), hold the lump of poison in the cork with two or three large-headed brass nails such as upholsterers use, and it is ready for use. To make it strong, so that it will kill quickly, touch a particle of water to the cyanide. When with use the cyanide has dissipated and become weak, you can put in another piece. It is sometimes recommended to place the cyanide in the bottom of the bottle, and then pour on plaster of Paris to hold it in place. This is plausible in theory, but worse than useless in practice, and is responsible for much profanity and for the loss of many butterflies, for it soon becomes weak and useless, and cannot readily be renewed. If your butterflies are small and delicate ones, put in your killing-bottle some fibres of raveled silk, or of cotton, or a tangle of fine thread; the butterflies' claws catch upon the fibres, and hold the insects from battering against the glass, and from rubbing one against another, and so spoiling themselves.

If you are about to climb a high hill or mountain, you will find after an ascent of 2,000 or 3,000 feet, that your cyanide bottle is wet inside, and that the fumes of the cyanide are very strong, indeed; that is caused by the "sweating" of the cyanide, and will soon dissolve all the cyanide, and leave you without any killing-bottle. The remedy is to open the bottle, place the cork in the sun, remove and dry the cyanide, wipe out and dry the bottle, and when thoroughly dry, replace the cyanide, and you are ready for work again. The cause of the sweating of the cyanide is the diminished pressure of the atmosphere, or the increased humidity of the mountain air.

When you have caught your butterfly, if it is a small and delicate one, slip the open bottle into the net, and let the butterfly fly into it. See to it that the cyanide is strong enough to kill the insect without delay. Many insects then have a way of flipping the wings down over the feet, instead of over the back in the ordin-

any way. If the wings are down, they must be at once righted, or the insect is ruined. Open the bottle and take the insect out, and with a nippers, such as watchmakers use, lay it in your hollowed hand, and with the nippers, open the wings and let them come together again over the back, in the ordinary way, when the wings will then so remain. As soon as the insect is dead for certain, take it out of the bottle and pin it on a long pin, sideways; you can put five or six small butterflies on one pin; then place the loaded pin in your collecting box, or in your hat.

If your butterfly is a large one, while it is yet in the net pinch the thorax under the wings just enough to stun or benumb it, and then it will not flutter and fray its wings when it is put into the bottle. All butterflies should be taken out of the poison bottle as soon as surely dead. If several are in the bottle at the same time, they get rubbed, one against the other, and so damaged or ruined.

Extra large or vigorous species are best killed while yet in the net, by piercing the thorax with a long pin or needle that has been dipped in a saturated solution of the cyanide; this kills them, instantly and painlessly, and preserves the specimen uninjured.

Sometimes, as when you are upon the top of a high mountain, and not able to get home at night, it is advisable to place the insects, as soon as dead, into separate papers, in which to bring them home. In that case, a tin can, fastened to your belt, or carried in your pocket, will receive the papered specimens, and carry them safely, to any distance. If that is your plan (and it is a good one), provide papers already folded, and of different sizes, and have them ready.

Setting-boards should be made with inclined sides, so that the tips of the wings, when set, will be higher than the bodies. This is the American style. The English style is to have the wings lay quite flat, or even a little drooping. But, in most climates, the insects' wings will settle a little, and are sure to do so if the climate is at all damp, so that in a few months, or years, they are likely to look very sad and despondent if set on the English plan. In a very dry climate the wings will remain for years just as they are placed when set.

In the middle of the setting-board is a channel made to receive the pins; this channel is to be filled at the bottom with a soft substance placed to receive the pins, and to hold the bodies steady while drying. The pith of cornstalks makes the very best sub-

stance for this purpose, and the pith of yucca stems is the only substitute worth mentioning. Provide plenty of setting-boards, some with wide channels, for thick-bodied insects, and others with narrow channels, for thin-bodied ones.

Entomological pins for butterflies are made in two lengths, and in seven numbers, as to thickness. The short pin is best for all except the largest specimens, and numbers two and three are suitable for by far the majority of specimens. Follow some well-considered plan; and use always the same sized pins for the same butterflies. In pinning specimens, let the pins be all the same height above the body of the butterfly, say, about one-half of an inch, or a little less.

Having placed the pinned butterfly upon the setting-board, with the bodies carefully placed at the proper height, so that the wings will not bend over the edge of the board, nor be bent down by the paper that is placed upon them to hold them down, place narrow strips of tough and thick paper over the wings and close up to the body; and then arrange the wings as they are to remain. Hold the strips of paper down with pins, for which use the large-headed steel pins are much the best. Push the wings forward evenly, one just as far as its mate. Taste and skill find opportunity to get in their work at this stage. Only one rule is worth mentioning, and that is, to place the fore wings so that the hind edges are on a straight line across; but there are many exceptions to that one rule, as the shape of the wings differ, so that it is not always proper to so place them. Then place strips of window glass over the wings, to hold them down even and smooth; the glass allows you to see at all times if the wings have become dislodged, or moved, in which case, they can be altered or rearranged while the specimen is fresh and soft. In this way a dozen specimens can be arranged upon one setting-board.

Next, is the most important item of work to be done, to write down the date, and the locality, on a small label or ticket, in small letters, and lay the label alongside the specimens. The insect will be dry in from one to three weeks, according to the weather, and the size of the insect. When dry, it should be removed from the setting-board, the ticket put upon the pin, and thereafter there is no adequate reason for ever removing it from the pin, and the ticket and the pin should never be separated. Do not remove the insect from the board too soon; if you do, the wings will droop.

When properly set, and well dried before removal, the wings will never droop, unless from undue dampness in the air. By "properly set" I mean that the body of the butterfly shall be neither too high nor too low, as noted above.

When setting butterflies, attend carefully to the antennæ; see that they are free and straight, and steady them with pins, if necessary, and if they are near the wings they will stand less risk of breaking. Sometimes the head will be turned a little, so that the antennæ are not even; then the head must be straightened, and held with pins, if necessary. See that the body is straight and level; if drooping, it must be held up with a bit of cotton, or by two pins crossed under it. Do not neglect the work at this stage of setting. If you are not willing to attend patiently to a great deal of work and drudgery at this point, do not catch butterflies at all; let them go. Don't get impatient and nervous. If you are troubled with "nerves," I advise you to quit before you begin to handle butterflies.

The next step is to place the set and dried specimens in the boxes or drawers where they will be safe from dust, and children, and curious visitors, and from the ever-present pests of mice, and moths, and little beetles. It is no use to catch butterflies, and set them, and care for them a while, and then let the museum-pests get them. It may cost quite a deal of money to get a suitable case of drawers, but it is better to let the butterflies alone, rather than to try to get along with defective and inadequate case or other safe storing place. Moth balls must be used freely and continuously, to keep the pests away, wherever they may be stored.

Drawers twenty inches wide, and twenty long, and deep enough to receive the longest pin, and with glass tops, hinged, are best; the side pieces should be long and project back a foot or more, or far enough to hold the drawer in place and allow the top to be lifted, else every time you lift the lid you must find some table or other place upon which to place it, while with this plan you can have a dozen drawers open at the same time. Make a pocket or cage in the center of each drawer, or at the corners, wherein to place a perpetual supply of the moth balls. The drawers must be well-made, with tight-fitting joints, and with closely-fitting lid or cover, to keep the pests out. "The best is the cheapest."



COMPLETE LIST OF THE BUTTERFLIES OF THE UNITED STATES

A classification of all the species in the United States, under their respective Generic Names, with the names of the authors and dates of publication of each species, and the habitats of the various species.

This complete list is published to show the relationship of our Coast butterflies with those of the whole United States.

The names of the Coast species are set in full-faced type, and are numbered consecutively, referring to corresponding numbers attached to the various figures on the plates and to the descriptions in the text.

Where a specific name is preceded by a hyphen it signifies that such name is a variety of the preceding species, except No. 6.

Family PARNASSIIDÆ

PARNASSIUS

- | | |
|---|----------------------------------|
| 1. Clodius , Menetries, 1855. | Cal.; Or.; Vanc. Isl.; B. C. |
| 2. -Clarins , Boisduval, 1852. | Mountains of California. |
| 3. -Altaurus , Dyar, 1902. | Wyoming; California. |
| 4. -Menetriesi , H. Edwards, 1878. | Sierra Nevadas of California. |
| 5. -Baldur , Edwards, 1877. | Mountains of California. |
| 6. -Hermodur , H. Edwards, 1881. | Colo.; Mont.; British America. |
| 7. -Smintheus , Doub.-Hew., 1847. | Rocky Mountains; Sierra Nevadas. |
| 8. -Behri , Edwards, 1870. | Sierra Nevadas of California. |
| 9. -Sayi , Edwards, 1863. | Rocky Mts.; Mts. of California. |
| 10. -Niger , n. v., Wright, 1905. | Sierra Nevadas. |
| 11. -Sedakovi , Menetries, 1855. | Rocky Mountains of Colorado. |
| 12. -Nanus , Neumøgen, 1890. | British Columbia. |
| 13. -Magnus , n. v., Wright, 1905. | British Columbia. |
| 14. Eversmanni , Menetries, 1855. | Alaska; Siberia. |
| 15. Nomlon , Fischer, 1823. | Alaska; Siberia. |

Family PAPILIONIDÆ

PAPILIO

- | | |
|---|-------------------------------------|
| Ajax, Linnæus, 1767. | Atlantic States; Mississippi Val. |
| -Walsh, Edwards, 1871. | Atlantic States. |
| -Abbott, Edwards, 1871. | Atlantic States. |
| -Telamoides, Felder, 1865. | Atlantic States. |
| -Marcellus, Bd.-Lec., 1833. | Atlantic States. |
| Sinon, Fabricius, 1775. | Florida; Antilles. |
| Pilumnus, Boisduval, 1836. | New Mex.; Ariz.; Mex.; Cent. Am. |
| 16. Daunus , Boisduval, 1836. | All States west of Mississippi Val. |
| 17. Eurymedon , Boisduval, 1852. | All States west of the Rocky Mts. |
| 18. -Albanus , Felder, 1865. | All States west of the Rocky Mts. |
| 19. Batalus , Boisduval, 1852. | All States west of the Rocky Mts. |
| 20. -Arizonensis , Edwards, 1883. | Arizona; New Mexico; Colorado. |
| 21. -Ammon , Behrens, 1887. | Nevada. |
| Turnus, Linnæus, 1771. | East of the Mississippi River. |
| -Glaucus, Linnæus, 1764. | East of the Mississippi River. |
| -Australis, Maynard, 1891. | East of the Mississippi River. |
| Palamedes, Drury, 1773. | Gulf States. |
| Trollus, Linnæus, 1764. | East of the Mississippi River. |
| -Texanus, Ehrmann, 1900. | Texas. |
| -Radiatus, Strecker, 1900. | Gulf States. |
| Thoas, Linnæus, 1777. | Atlantic States. |
| Cresphontinus, Martyn, 1797. | Florida. |
| 22. Machaon , Linnæus, 1761. | Alaska; Europe. |
| 23. -Alaska , Scudder, 1869. | Alaska. |
| Baird, Edwards, 1869. | Arizona; Colorado. |
| -Brucei, Edwards, 1895. | Colorado. |
| -Hollandi, Edwards, 1892. | Colorado. |
| 24. Zolicaon , Boisduval, 1852. | Pacific C. States to Wrangel, Alas. |
| 25. -Colorado , Wright, n. v., 1905. | Colorado Desert of California. |
| 26. Oregonia , Edwards, 1880. | Ore.; Wash.; Vancouver; Colo. |
| Americus, Kollar, 1850. | Mexico. |
| 27. Indra , Reakert, 1866. | California; Nevada; Wash.; Colo. |
| Nitra, Edwards, 1883. | Montana; Rocky Mts. of Brit. Am. |
| 28. Pergamus , H. Edwards, 1874. | Southern California. |
| Brevicauda, Saunders, 1869. | Labrador; New Foundland. |
| 29. Asterias , Fabricius, 1787. | Atlantic to Pacific. |
| 30. -Asteroides , Reakert, 1866. | Cal.; Nevada; Utah; Ariz.; Mex. |
| -Calverleyi, Grote, 1864. | Long Island; Florida. |
| -Amplifascia, Menetries, 1857. | Eastern States. |
| -Alunata, Skinner-Aaron, 1889. | Eastern States. |
| -Semialba, Ehrman, 1900. | Eastern States. |
| -Curvifascia, Skinner, 1902. | Eastern States. |
| 31. Philenor , Linnæus, 1771. | Eastern States; California; Mex. |
| -Obsoleta, Ehrman, 1900. | Eastern States. |
| -Wasmuthi, Weeks, 1901. | Eastern States. |
| Acauda, Oberthur, 1880. | New Mexico. |
| Polydamus, Linnæus, 1769. | Florida. |

Family PIERIDÆ

ARCHONIAS

Lyceas, God.-Salvin, 1889.

Arizona; Mexico.

LEPTALIS

Melite, Linnæus, 1867.

New Mexico; Mexico.

NEOPHASIA32. *Menapia*, Felder, 1859.

North Cal.; Or.; Wash.; Brit. Col.

33. *-Suffusa*, Stretch, 1885.

North Cal.; Or.; Wash.; Brit. Col.

Terlool, Behr, 1869.

Arizona; Mexico.

-Princetonia, Polling, 1900.

Arizona.

PIERIS

Ilalre, Godart, 1819.

Florida; Texas.

-Neumœgeni, Skinner, 1894.

Florida; Texas.

Amaryllis, Fabricius, 1797.

Texas; Mexico.

Monuste, Linnæus, 1764.

Southern States.

34. *Beckeri*, Edwards, 1871.

Cal.; Or.; Wash.; Colo.

35. *Sisymbri*, Boisduval, 1854.

Cal.; Or.; Wash.; Colo.

36. *-Flava*, Edwards, 1881.

Sierra Nevadas of California.

37. *Nelsoni*, Edwards, 1880.

St. Michaels, Alaska.

38. *Occidentalis*, Reakert, 1886.

West Coast States to Rocky Mts.

39. *-Calyce*, Edwards, 1870.

West Coast States to Rocky Mts.

40. *Protodice*, Bols.-Lec., 1833.

United States, except New Eng.

41. *-Vernalis*, Edwards, 1864.

United States, except New Eng.

42. *Bryonia*, Ochsenheimer, 1808.

Alaska, Chilikat, Sitka.

43. *-Hulda*, Edwards, 1869.

Alaska, Chilikat, Sitka.

44. *Ochsenheimeri*, Staudinger, 1886.

Alaska, Siberia.

45. *Venosa*, Scudder, 1861.

Cape Mendocino to Alaska.

Oleracea, Harris, 1829.

Northeastern States.

Borealis, Grote, 1873.

Labrador.

Frigida, Scudder, 1861.

Northern British America.

Virginienis, Edwards, 1870.

Middle States.

Acadica, Edwards, 1881.

New Foundland.

46. *Pallida*, Scudder, 1861.

California, to British Columbia.

47. *Castoria*, Reakert, 1866.

California, to British Columbia.

Cruciferanum, Boisduval, 1836.

Northeastern States.

48. *Rape*, Linnæus, 1758.

Atlantic to Pacific.

49. *-Nov-Angliæ*, Scudder, 1872.

Atlantic to Pacific.

50. *-Immaculata*, Skinner, 1889.

Atlantic to Pacific.

51. *-Marginalis*, Scudder, 1861.

Atlantic to Pacific.

NATHALIS52. *Iole*, Boisduval, 1836.

All States west of the Mississippi.

EUCHLOE53. *Lanceolata*, Boisduval, 1852.

Coast States; Mex. to St. Mich., A.

54. *Creusa*, Dbl.-Hew., 1847.

Southern Cal.; Utah; Arizona.

55. *Hyantis*, Edwards, 1871.

Colo.; Ariz.; Southern Cal.

Olympia, Edwards, 1871.

Middle Western States.

56. *Rosa*, Edwards, 1882.

Western Texas; Arizona.

EUCHLOE—continued.

57. *Ausonides*, Boisduval, 1852. All States west of the Rocky Mts.
 —*Coloradensis*, H. Edwards, 1881. Colorado.
 —*Lotta*, Beutenmuller, 1898. Rocky Mountains of Colorado.

ANTIOCHARIS

58. *Cethura*, Felder, 1865. Southern California.
 59. —*Morrisoni*, Edwards, 1881. Kern River, California.
 60. —*Deserti*, n. v., Wright, 1905. Colorado Desert of California.
 61. *Genutia*, Fabricius, 1793. Southern Atlantic States.
 62. *Beakirti*, Edwards, 1869. California.
 63. —*Thocosa*, Scudder, 1878. Utah, Valley of the Virgin River.
 64. —*Julia*, Edwards, 1872. Colorado; Nevada; Arizona; Cal.
 65. —*Flora*, Wright, 1892. Oregon; Washington.
 66. *Sara*, Boisduval, 1852. Cal.; Utah; Rocky Mountains.
 67. —*Mollis*, n. v., Wright, 1905. Southern California.
 68. *Stella*, Edwards, 1879. Cal. Mts.; E. Or.; E. Wash.; Idaho.
 69. *Pima*, Edwards, 1883. Arizona.
 70. *Caliente*, n. s., Wright, 1905. Colorado Desert of California.

CALLIDRYAS

- Philea, Linnæus, 1766. Mississippi Valley.
 71. *Eubule*, Linnæus, 1766. United States, except New Eng.
 Statira, Cramer, 1779. Florida; Antilles; South America.
 Argante, Fabricius, 1775. Florida; Texas; Mexico.
 Agarithe, Boisduval, 1836. Mississippi Valley.

GONEPTERYX

- Clorinde, Godart, 1823. Texas; Mexico; South America.

ERICOGONIA

- Lyside, Godart, 1819. Florida; Texas; Mexico.
 Teressa, Lucas, 1852. Texas; Mexico.
 Lanice, Lintner, 1884. Texas.
 Fantasia, Butler, 1871. Texas; Mexico.
 Unicolor, God.-Salv., 1889. Texas; Mexico.

MEGASTOMA

72. *Eurydice*, Boisduval, 1855. Arizona; California; Oregon.
 73. —*Bernardino*, Edwards, 1887. Southern California.
 74. —*Amorpheus*, H. Edwards, 1876. California.
 75. *Cassonia*, Stoll, 1790. Southern States; Southern Cal.
 —*Rosea*, McNeill, 1889. Illinois.

COLIAS

76. *Eurytheme*, Boisduval, 1852. States west of the Rocky Mts.
 77. —*Ariadne*, Edwards, 1870. States west of the Rocky Mts.
 78. —*Keewaydin*, Edwards, 1869. States west of the Rocky Mts.
 79. —*Pallida*, Cockerell, 1887. States west of the Rocky Mts.
 80. —*Intermedia*, Cockerell, 1888. States west of the Rocky Mts.
 81. —*Autumnalis*, Cockerell, 1888. States west of the Rocky Mts.
 82. —*Fumosa*, Strecker, 1900. States west of the Rocky Mts.
 83. *Eriphyle*, Edwards, 1876. British Columbia; B. America.
 Philodice, Godart, 1819. Atlantic Coast to Mississippi Val.

COLIAS—continued.

- Anthyle, Hubner, 1823. Atlantic Coast States.
 -Melanic, Edwards, 1876. Atlantic Coast States.
 -Luteincta, Wolcott, 1893. Atlantic Coast States.
 -Miscidice, Scudder, 1889. Atlantic Coast States.
 84. **Harfordi**, H. Edwards, 1877. Southern California.
 85. **Barbara**, H. Edwards, 1877. Southern California.
 86. **Occidentalis**, Scudder, 1862. British Columbia; Vancouver Is.
 87. **Chrysomelas**, H. Edwards, 1877. Northern California; Utah.
 88. Alexandra, Edwards, 1863. Colorado; Montana; British Am.
 89. **Edwardsi**, Behr, 1870. California; Nevada; Utah; B. A.
 90. **Christina**, Edwards, 1863. Montana; British America.
 91. **-Astrea**, Edwards, 1872. Mont.; N. E. Cal.; E. Or.; E. Wash.
 -Pallida, Lyman, 1884. Montana.
 92. **Emilia**, Edwards, 1870. Ore.; Wash.; British Columbia.
 Interior, Scudder, 1862. British America; Alaska.
 93. **Scudderi**, Reakert, 1865. Colo.; Mont.; Br. Am.; Br. Col.
 Pellidne, Boisduval, 1832. Labrador; Arctic Europe.
 -Skinneri, Barnes, 1897. Mont.; Wyoming; Idaho; Br. Am.
 Paleno, Linnaeus, 1767. Labrador; N. Alaska; N. Asia.
 -Verdandi, Herr-Schaff., 1848. Northern Alaska; Northern Asia.
 94. **Meadii**, Edwards, 1871. Colorado; Mont.; Br. America.
 95. **-Ellis**, Strecker, 1885. British Columbia; Br. America.
 Hecla, Lefebvre, 1836. Arctic America; Arctic Europe.
 -Glacialis, McLachlan, 1878. Arctic America; Arctic Europe.
 -Hela, Strecker, 1880. Northern Alaska.
 Pallida, Skin-Mengel, 1892. Arctic America; Arctic Europe.
 Boothii, Curtis, 1836. Boothia Felix.
 Nastes, Boisduval, 1832. Labrador; Hud. Bay; Arctic Eur.
 -Rossi, Guenee, 1864. Boothia Felix.
 -Streckeri, Grun.-Gr., 1895. Hudson Bay.
 Molina, Strecker, 1880. Hudson Bay.
 96. **Behri**, Edwards, 1886. Central California, Alpine Mts.

TERIAS

- Gundlachia, Poey, 1851. Texas; Arizona; Mexico; Cen. Am.
 Proterpia, Fabricius, 1775. Texas; Arizona; Mexico; Cen. Am.
 97. **Niclippe**, Cramer, 1782. Gulf States; Ariz.; So. California.
 98. **Mexicana**, Boisduval, 1836. Texas; Arizona; Colorado; Mexico.
 -Boisduvallana, Felder, 1865. Arizona; Mexico.
 -Flava, Strecker, 1878. Gulf States.
 Westwoodi, Boisduval, 1836. Texas; Mexico; Central America.
 Euterpe, Menetries, 1832. Atlantic States; Mexico.
 -Alba, Strecker, 1878. Atlantic States.
 -Clappi, Maynard, 1891. Florida.
 Linda, Edwards, 1884. Mexico.
 Della, Cramer, 1782. Gulf States.
 Jucunda, Bois.-Lec., 1833. Gulf States; Mexico.
 -Blakei, Maynard, 1891. Southern Florida.

Family **HELICONIDÆ****HELICONIA**

99. *Charitonia*, Linnæus, 1767. Florida; Antilles.

Family **DANAIDÆ****DANAIS**

100. *Plexippus*, Linnæus, 1758. Cosmopolitan.
 101. *Berenice*, Cramer, 1782. Southern States; Colo.; New Mex.
 102. *-Strigosa*, Bates, 1864. So. California; Arizona; Texas.

CERATINIA

- Lycaste*, Fabricius, 1793. Southern California?

MECHANITIS

103. *Californica*, Reakert, 1865. Southern California?

DIRCENNA

- Klugl, Hubner, 1837. Texas; Mexico.

LYCOBEEA

- Cleobæa*, Godart, 1819. Florida.
-Atergatis, Dbl.-Hew., 1847. Florida.
-Pales, Felder, 1862. Florida.

Family **NYMPHALIDÆ****COLENTIS**

- Julia*, Fabricius, 1775. Florida; Texas; Mexico.
Delila, Fabricius, 1775. Texas; Mexico; Central America.

AGRAULIS

104. *Vanilla*, Linnæus, 1764. Atlan. to Pacific, south of lat. 40°.

EUPTOIETA

105. *Claudia*, Cramer, 1779. E. States; Ariz.; Mont.; Utah.
Hegesia, Cramer, 1782. Arizona; Texas; Mexico.

ARGYNNIS

- Diana*, Cramer, 1779. Southern States to the Miss. Riv.
Idalia, Drury, 1775. Eastern States to the Miss. Riv.
-Astharoth, Fisher, 1885. Eastern States.
 106. *Nokomis*, Edwards, 1862. Arizona; Southern Utah.
 107. *Nitocris*, Edwards, 1875. Southern Arizona to Nevada.
 108. *-Cærulescens*, Holl, 1900. Mexico.
 109. *-Nigrocærulea*, Cock, 1900. New Mexico.
 110. *Leto*, Behr, 1862. N. Cal.; Or.; Wash.; and E. to R. M.
 111. *-Letis*, n. v., Wright, 1905. Northern California.
Cybele, Fabricius, 1775. Atlantic States to the Miss. Riv.
-Baal, Strecker, 1878. Atlantic States.
-Charlottl, Barnes, 1897. Colorado.
 112. *Carpenteri*, Edwards, 1876. Arizona to British Columbia.
Aphrodite, Fabricius, 1793. Atlantic States to Miss. River.
 113. *-Cypria*, Edwards, 1886. Colorado; Ariz.; Mont.; So. Cal.
-Alcestis, Edwards, 1876. Middle States.

ARGYNNIS—continued.

114. **Nausicaa**, Edwards, 1874.
Lals, Edwards, 1883.
Atlantis, Edwards, 1862.
115. **Hippolyta**, Edwards, 1879.
116. **-Oweni**, Edwards, 1892.
Cornelia, Edwards, 1892.
Electa, Edwards, 1878.
117. **Columbia**, H. Edwards, 1877.
118. **Hesperis**, Edwards, 1864.
119. **Bremneri**, Edwards, 1872.
120. **Zerene**, Bolsduval, 1852.
121. **-Hydaspe**, Bolsduval, 1869.
122. **Monticola**, Behr, 1862.
123. **-Purpurascens**, H. Eds., 1876.
124. **Rhodophe**, Edwards, 1874.
125. **Behrensi**, Edwards, 1869.
Halcyone, Edwards, 1869.
126. **Coronis**, Behr, 1862.
-Platina, Skinner, 1897.
-Snyderi, Skinner, 1897.
127. **Callippe**, Bolsduval, 1852.
128. **Nevadensis**, Edwards, 1870.
-Meadl, Edwards, 1872.
129. **Edwardsi**, Reakert, 1866.
130. **Liliana**, H. Edwards, 1876.
131. **-Baroni**, Edwards, 1881.
Chitone, Edwards, 1879.
132. **Rupestria**, Behr, 1862.
- 132a. **-Irene**, Bolsduval, 1869.
133. **Laura**, Edwards, 1879.
134. **Laurina**, n. v., Wright, 1905.
135. **Macaria**, Edwards, 1877.
136. **Semiramis**, Edwards, 1886.
137. **Inornata**, Edwards, 1872.
138. **Adiante**, Bolsduval, 1869.
139. **Atossa**, Edwards, 1890.
140. **Eurynome**, Edwards, 1872.
-Cunninghami, Owen, 1893.
Artonis, Edwards, 1881.
Opis, Edwards, 1874.
141. **Blaschoffi**, Edwards, 1870.
142. **Montivaga**, Behr, 1862.
143. **-Arge**, Strecker, 1878.
144. **-Errinna**, Edwards, 1883.
145. **Egleis**, Bolsduval, 1869.
- EBRENTIS**
146. **Myrina**, Cramer, 1779.
- 146a. **-Pales**, Denis-Schiff., 1776.
- Arizona.
Assinibola.
Northeastern States.
Northern California; Oregon.
Northern California.
Colorado.
Colorado; New Mexico; Montana.
British Columbia.
Colorado; Utah; Montana.
British Columbia; Wash.; Ore.
California; Nevada.
California; Nevada.
Cal.; Ore.; Wash.; Nevada; Mont.
Cal.; Ore.; Wash.; Nevada; Mont.
British Columbia; Alberta.
Northern California.
Colorado; Wyoming.
So. Cal. to Wash.; Utah; Mont.
Utah; Idaho.
Utah; Idaho.
Southern California.
Cal.; Nev.; Utah; Mont.; Alberta.
Nevada; Utah; Montana; Alberta.
Cal.; Or.; Colo.; Mont.; Alberta.
California; Utah.
California; Utah.
Southern Utah; Northern Arizona.
Northern and Central Cal.; Utah.
California; Utah.
Southern California.
Southern California.
Southern California.
Southern California.
California; Nevada.
Central California.
Southern California.
Colorado; Montana; B. America.
Rocky Mountains.
Nevada; Utah; Colo.; Wyoming.
British America.
Alaska, Coast; Sitka; St. Michael.
California; Nevada.
California.
Colorado; Montana; British Am.
California; Nevada.
- Northeastern States; N. Alaska.
Northern Alaska; N. Europe.

BENTHIS—continued.

147. **Triclaris**, Hubner, 1818. Arctic Am.; Rocky Mts.; Labrador.
 148. **Helena**, Edwards, 1871. Rocky Mts. of Col.; N. Mex.; Mont.
 Montinus, Scudder, 1862. White Mts. of New Hampshire.
 Chariclea, Schneid, 1794. Arctic Am.; Brit. Am.; Labrador.
 -Arctica, Zetter., 1828. Arctic America; Arctic Europe.
 -Obscurata, McLachlan, 1878. Arctic America.
 -Butleri, Edwards, 1883. Northwestern Alaska.
 -Boisduvall, Dupon, 1832. Brit. Col.; Brit. Am.; Labrador.
 149. **Freija**, Thunberg, 1791. Rocky Mts. of Colorado to Alaska.
 -Tarquinius, Curtis, 1835. Rocky Mountains of Colorado.
 Polaris, Boisduval, 1829. Arctic America.
 150. **Frigga**, Thunberg, 1791. Arctic Am.; R. Mts.; Colo. to Alas.
 -Saga, Kaden, 1861. Arctic America.
 -Improba, Butler, 1877. Arctic America.
 Bellona, Fabricius, 1775. Eastern Canada, south to Virginia.
 151. **Epithore**, Boisduval, 1869. Cal.; Nev.; Or.; Wsn.; Vanc. to Al.
 152. **Kremhild**, Strecker, 1879. Arizona.
 Alberta, Edwards, 1890. Alberta.
 Astarte, Doub.-Hew., 1848. Alberta.

DIADEMA

- Misippus, Linnæus, 1764. Atlantic States.

MELITÆA

- Phæton, Drury, 1767. States East of Mississippi River.
 153. **Cooperi**, Behr, 1863. E. Wash.; Or.; N. Cal.
 154. **Colo**, Edwards, 1881. Western Oregon; Northern Calif.
 155. **Quino**, Behr, 1863. Northwestern California.
 156. **Baroni**, H. Edwards, 1882. Northwestern California.
 157. **Chalcedon**, Doub.-Hew., 1847. California, south and north.
 158. **Dwinell**, H. Edwards, 1881. California.
 -Fusimaculata, Barnes, 1890. California.
 -Mariana, Barnes, 1890. California.
 159. **McGlashani**, Rivers, 1889. Central California.
 160. **Olantha**, n. s., Wright, 1905. Sierra Nevadas.
 161. **Editha**, Boisduval, 1852. Central California.
 162. **Eubicunda**, H. Edwards, 1882. Northern California.
 163. **Sierra**, n. s., Wright, 1905. Central California Mountains.
 164. **Taylori**, Edwards, 1888. Vancouver Island.
 Maria, Skinner, 1899. Utah.
 165. **Anicia**, Dbl.-Hew., 1846. Cal.; Nevada; Colo.; Rocky Mts.
 166. **-Wheeleri**, H. Edwards, 1881. Nevada; Colorado.
 167. **-Brucei**, Edwards, 1888. Rocky Mountains of Colorado.
 168. **-Beani**, Skinner, 1897. Rocky Mountains of British Am.
 Gilletti, Barnes, 1897. Wyoming.
 169. **Augusta**, Edwards, 1890. Southern California.
 170. **-Augustina**, n. v., Wright, 1905. Southern California.
 171. **Nubigena**, Behr, 1863. Rocky Mountains of Colorado.
 172. **Helvia**, Scudder, 1869. Alaska.
 173. **Sterope**, Edwards, 1870. Oregon.

MELITÆA—continued.

174. **Gabbi**, Behr, 1863. California; Utah; Arizona.
175. **Acastus**, Edwards, 1874. Rocky Mountains; Calif.; Oregon.
Neumegeni, Skinner, 1895. Utah.
176. **Falla**, Bolsduval, 1852. Rocky Mountains; Sierra Nevadas.
177. **Whitneyi**, Behr, 1863. California; Nevada.
178. **Eremita**, n. s., Wright, 1905. Lake County, California.
179. **Hermosa**, n. s., Wright, 1905. Southern Arizona.
180. **Colonia**, n. s., Wright, 1905. Northern Oregon.
181. **Sabina**, n. s., Wright, 1905. Catalina Mountains of Arizona.
182. **Hoffmanni**, Behr, 1863. Sierra Nevadas; Rocky Mountains.
-Helcita, Bolsduval, 1869. Rocky Mountains.
183. **-Abnorma**, n. v., Wright, 1905. Sierra Nevadas, 7,000 ft., Calif.
184. **-Mirabilis**, n. v., Wright, 1905. Lake County, California.
185. **Cyneas**, God.-Salv., 1882. Arizona.
186. **Leona**, n. s., Wright, 1905. Southern California.
Albiplaga, Aaron, 1884. Texas.
187. **Leanira**, Bolsduval, 1869. Northern California; Nev.; Mont.
-Obsoleta, H. Edwards, 1876. Rocky Mountains.
188. **Wrighti**, Edwards, 1886. Southern California.
189. **Cerrita**, n. s., Wright, 1904. Southern California.
190. **Alma**, Strecker, 1877. Arizona; Utah.
Harris, Scudder, 1862. Atlantic States.
Elada, Hewitson, 1864. Texas.
Dymas, Edwards, 1877. Texas.
Theona, Menetries, 1855. Texas; Colorado.
191. **Nympha**, Edwards, 1884. Arizona; Mexico.
192. **Bolli**, Edwards, 1877. Texas; Arizona.
Defnita, Aaron, 1884. Texas.
193. **Thecla**, Edwards, 1870. Texas; Arizona; California.
194. **Minuta**, Edwards, 1861. Rocky Mountains of Colorado.
Arachne, Edwards, 1869. Rocky Mountains of Colorado.
195. **Chara**, Edwards, 1883. California; Arizona.
196. **Perse**, Edwards, 1882. Arizona.

PHYCIODES

197. **Nycteis**, Doub.-Hew., 1847. Atlantic States to Mississippi Riv.
198. **-Pascoensis**, n. v., Wright, 1905. Eastern Oregon.
-Drusius, Edwards, 1884. Northern States to Mississippi R.
Ismeria, Bois.-Lec., 1833. Canada; Southern and W. States.
Vesta, Edwards, 1869. Texas; Mexico.
-Boucardi, God.-Salvin, 1879. Texas; Mexico.
Phaon, Edwards, 1864. Gulf States; Texas.
199. **Tharos**, Drury, 1779. United States, except Pac. Coast.
-Morpheus, Fabricius, 1775. United States, except Pac. Coast.
-Packard, Saunders, 1869. United States, except Pac. Coast.
200. **-Marcia**, Edwards, 1868. U. S., except Ore.; Wash.; Alaska.
Batesi, Reakert, 1865. Middle States.
201. **Pratensis**, Behr, 1863. California; Oregon; Arizona.
202. **Orseis**, Edwards, 1871. Pacific Coast States.

PHYCIODES—continued.

203. **Camillus**, Edwards, 1871. Wash.; Colorado; Mont.; Texas.
 —**Emissa**, Edwards, 1871. Rocky Mountains.
 —**Pallida**, Edwards, 1864. Rocky Mountains.
 —**Mata**, Edwards, 1866. Rocky Mountains.
 204. **Myllitta**, Edwards, 1861. Cal.; Or.; Wash.; Colo.; Utah; Al.
 204a. —**Barnesi**, Skinner, 1897. Colorado.
 205. **Montana**, Behr, 1863. California; Nevada.
 206. **Picta**, Edwards, 1865. Colorado; New Mexico; Ariz.; Tex.

FRISIA

- Frisia**, Poey, 1832. Florida; Antilles; Mexico.
 207. **Texana**, Edwards, 1863. Texas; Mexico.
 —**Tulcis**, Bates, 1864. Arizona; Texas; Mexico.

SYNCHLOE

- Janals**, Drury, 1782. Texas; Mexico; Central America.
 208. **Lacinia**, Hubner, 1837. Arizona; Texas; N. Mexico; Mex.
 209. —**Crocato**, Edwards, 1874. Arizona; New Mexico; Texas.
 210. —**Eufescens**, Ckll., 1890. Arizona; New Mexico; Texas.
 211. —**Nigrescens**, Ckll., 1890. Arizona; New Mexico; Texas.
 212. **Californica**, n. s., Wright, 1904. Colorado Desert of Southeast. Cal.
 —**Erodyle**, Bates, 1864. Texas; Mexico; Central America.

CYSTINEURA

- Amymone**, Menetries, 1857. Texas; Mexico; Central America.
 —**Floridana**, Strecker, 1900. Florida.

GRAPTA

- Interrogationis**, Fab., 1798. States East of Continental Divide.
 —**Fabriel**, Edwards, 1870. States East of Continental Divide.
 —**Umbrosa**, Lintner, 1869. States East of Continental Divide.
 —**Comma**, Harris, 1842. Northern States to Mississippi R.
 —**Harrisi**, Edwards, 1873. Eastern and Middle States.
 —**Dryas**, Edwards, 1870. Eastern and Middle States.
 213. **Satyrus**, Edwards, 1869. States West of Continental Divide.
 214. —**Marsyas**, Edwards, 1870. States West of Continental Divide.
 —**Hylas**, Edwards, 1872. Colorado.
 215. **Fannus**, Edwards, 1874. U. S., ex. Cal.; Nev.; Ar.; N. M.; U.
 216. **Rusticus**, Edwards, 1874. Cal.; Or.; Wash.; Vanc. Island.
 217. —**Silvius**, Edwards, 1874. California.
 218. **Zephyrus**, Edwards, 1870. Cal.; O.; Nev.; Utah; A.; Mt.; N. M.
 219. **Gracilis**, Grote-Rob., 1867. New England; Brit. Am.; Alaska.
 220. **Silennus**, Edwards, 1870. Cal.; Or.; Wash.; Vanc. Is.; Mont.
 221. —**Orens**, Edwards, 1869. Cal.; Or.; Wash.; Vanc. Is.; Mont.
 222. **Chrysoptera**, n. s., Wright, 1905. California.
 —**Progne**, Cramer, 1775. States East of Mississippi River.
 —**Argenteum**, Scudder, 1875. States East of Mississippi River.
 —**J-Album**, Bois-Lec., 1833. Northern States; B. Possessions.

VANESSA

223. **Antiope**, Linnaeus, 1758. North America; Europe; Siberia.
 224. —**Hippolite**, Lyman, 1898. British Columbia.
 —**Hyglæa**, Heydenreich, 1851. North America; Europe.

VANESSA—continued.

225. **Californica**, Boisduval, 1852. States W. of R. Mts., ex. Ar.; N. M.
 226. **Milberti**, Godart, 1819. N. States; Pac. Coast States; Alas.
 -**Furcellata**, Say, 1825. East of Mississippi River.
 -**Subpallida**, Cock., 1889. East of Mississippi River.

PYRAMIS

227. **Atalanta**, Linnæus, 1758. North Am.; Europe; Asia; Africa.
 228. **Huntera**, Fabricius, 1775. North America; South America.
 -**Fulvia**, Dodge, 1900. United States.
 229. **Cardui**, Linnæus, 1758. Cosmopolitan.
 230. -**Minor**, Cockerell, 1890. United States.
 -**Elymi**, Rambur, 1829. Uncertain.
 -**Ate**, Strecker, 1878. Eastern United States.
 231. **Carye**, Hubner, 1806. W. of Sierra Nev.; Vanc. to Argent.
 232. -**Hybrid**, H. Edwards, 1878. Pacific States.
 233. -**Muelleri**, Letcher, 1898. California; Atlantic States.

JUNONIA

234. **Coenia**, Hubner, 1816. North America.
 235. **Genoveva**, Cramer, 1782. Arizona; Mexico.

VICTORINA

- Steneles, Linnæus, 1758. Florida; Texas; Mexico; S. Am.

ANARTIA

- Jatrophæ, Linnæus, 1764. Tex.; Florida; Mex.; Cent. Am.

EUREMA

- Lethe, Fabricius, 1793. Texas; Mexico; South America.

EUNICA

- Monima, Cramer, 1782. Florida; Texas; Mexico.
 Tatila, Herr.-Schaft., 1852. Florida; Mexico; South America.

TIMETES

- Coresta, Godart, 1823. Texas.
 Petreus, Cramer, 1779. Florida; Mexico.
 Chiron, Fabricius, 1775. Texas; Mexico.
 Eleucha, Hubner, 1816. Florida; Texas.

AMPHICLOBA

- Fornax, Hubner, 1824. Texas; Mexico.
 Feronia, Linnæus, 1764. Texas; Mexico.

LIMENITIS

- Astynax, Fabricius, 1775. States East of Rocky Mountains.
 236. -**Arizonensis**, Edwards, 1882. Arizona.
 -**Cerulea**, Ehrman, 1900. Pennsylvania.
 Arthemis, Drury, 1773. N. States; British Possessions.
 -**Prosperina**, Edwards, 1865. Northern United States.
 237. **Weidmayeri**, Edwards, 1861. W. of R. Mts., and E. of Sierra Nev.
 238. -**Sinefascia**, Edwards, 1882. W. of R. Mts., ex. Coast States.
 Misippus, Linnæus, 1764. United States, except Pac. Coast.
 -**Nig**, Strecker, 1878. Florida.
 -**Pseudorippus**, Strecker, 1878. New York; Massachusetts.
 -**Floridensis**, Strecker, 1878. Florida.
 239. **Obsoleta**, Edwards, 1882. Arizona.

LIMENTIS—continued.

240. *Lerquini*, Bolsduval, 1852.
 241. *-Eavesi*, H. Edwards, 1878.

Pacific Coast States, N. to Sitka.
 Pacific Coast States.

HEPESOCHEA

242. *Bredowi*, Hubner, 1837.
 243. *-Californica*, Butler, 1865.

S. Cal.; S. Nevada; Ariz.; Mex.
 California; Nevada.

APATURA

244. *Celtis*, Bois.-Lec., 1833.
-Alba, Edwards, 1876.
Antonia, Edwards, 1877.
 245. *-Montis*, Edwards, 1882.
 246. *Lella*, Edwards, 1874.
Alicia, Edwards, 1868.
Clyton, Bois.-Lec., 1833.
-Prosperina, Scudder, 1868.
-Ocellata, Edwards, 1876.
Flora, Edwards, 1876.
Cocles, Lintner, 1884.

Southern and Gulf States.
 Southern States.
 Texas.
 Arizona; Colorado to Montana.
 Arizona.
 Florida to Texas.
 States East of Mississippi Valley.
 East of Mississippi Valley.
 East of Mississippi Valley.
 Florida; Texas.
 Texas.

PAPHIA

- Karwinski*, Hubner, 1826.
Odius, Fabricius, 1775.
 247. *Andria*, Scudder, 1875.
 248. *-Morrisoni*, Edwards, 1883.
Portia, Fabricius, 1775.

Texas; Mexico.
 Florida; South America.
 Mississippi Valley.
 Arizona.
 Florida; Antilles.

Family SATYRIDÆ

SATYRUS

- Pegala*, Fabricius, 1775.
Alope, Fabricius, 1793.
-Texana, Edwards, 1880.
 249. *Stephensi*, n. s., Wright, 1904.
 250. *Gabbi*, Edwards, 1870.
 250a. *Wheeleri*, Edwards, 1873.
 251. *Nephele*, Kirby, 1837.
 252. *Boopis*, Behr, 1864.
 253. *Ariane*, Bolsduval, 1852.
 254. *-Baroni*, Edwards, 1880.
 255. *-Incana*, Edwards, 1880.
 256. *Cetus*, Bolsduval, 1869.
 257. *Paulus*, Edwards, 1879.
 258. *Charon*, Edwards, 1870.
 259. *Silvestris*, Edwards, 1861.
 260. *Stehenele*, Bolsduval, 1852.

South Atlantic States.
 Northeastern Atlantic States.
 Texas.
 Northeastern Cal.; Nevada; Ore.
 Oregon; Utah.
 Eastern California; Ariz.; Utah.
 New Eng., west to the Sierra Nev.
 California; Oregon; Washington.
 Northern Cal.; Oregon and East.
 Northern California.
 Washington; Northern California.
 Northern California.
 California; Nevada; Colorado.
 Sierra Nevadas.
 States west of the Rocky Mts.
 San Francisco (extinct).

HEPESOCHELIUS

- Tritonia*, Edwards, 1874.

Arizona; Mexico.

HEBRIA

- Fasciata*, Butler, 1868.
Discoidalis, Kirby, 1837.
Rossi, Curtis, 1835.

Alaska; Boreal America.
 Alaska; Boreal America.
 Boreal America.

EEEBIA—continued.

- Disa, Thunberg, 1791.
 —Mancinus, Dbl.-Hew., 1851.
 Vidleri, Elwes, 1898.
 Tyndarus, Esper, 1871.
 261. —**Callias**, Edwards, 1871.
 262. **Epipsodea**, Butler, 1868.
 —Brucei, Elwes, 1889.
 263. **Sofia**, Strecker, 1884.
 —**Alaskensis**, Holland, 1900.
 264. **Magdalena**, Strecker, 1880.
 265. —**Youngi**, Holland, 1900.

Arctic America.
 Alaska; Rocky Mountains.
 British Columbia.
 Colorado; New Mexico; Europe.
 Colorado; New Mexico.
 Rocky Mountains.
 Colorado.
 Alaska.
 Alaska.
 Colorado.
 Alaska.

TEONYMPHA

- Canthus, Boisduval, 1823.
 Gemma, Hubner, 1818.
 266. **Henshawii**, Edwards, 1876.
 267. **Haydeni**, Edwards, 1872.
 Phocion, Fabricius, 1781.
 Eurytus, Fabricius, 1775.
 Mitchell, French, 1889.
 Sosybius, Fabricius, 1793.
 268. **Rubricata**, Edwards, 1891.

Northeastern States.
 South Atlantic States.
 Arizona; Colorado; New Mexico.
 Yellowstone Pk.; Mont.; Ida.; Wyo.
 Atlantic States.
 States east of Mississippi River.
 Michigan; New Jersey.
 States east of Mississippi River.
 Texas; Arizona; Mexico.

EPIPEPELE

269. **Xicaque**, Reakert, 1866.

Arizona; Mexico.

NEOMINOIS

270. **Ridingsi**, Edwards, 1865.
 271. **Dionysius**, Scudder, 1878.

Colo.; Nev.; Mont.; Utah; Wyo.
 Colorado; Arizona; Utah.

CEONYMPHA

272. **Californica**, Doub.-Hew., 1850.
 273. —**Galaetinus**, Boisduval, 1852.
 274. —**Eryngi**, H. Edwards, 1877.
 275. —**Ceres**, Butler, 1866.
 276. —**Falla**, H. Edwards, 1881.
 277. —**Kodiak**, Edwards, 1869.
 278. **Elko**, Edwards, 1880.
 279. **Inornata**, Edwards, 1861.
 280. **Ampelos**, Edwards, 1871.
 281. **Ochracea**, Edwards, 1861.
 282. **Brenda**, Edwards, 1869.
 283. **Pamphilus**, Linneus, 1758.
 Typhon-ladon, Borkhausen, 1788.

N. California; Nev.; Ore.; Wash.
 Southern California.
 Southern California.
 Central California.
 California Mountains.
 Alaska.
 Nevada; Eastern Washington.
 Washington; Idaho; Mont.; East.
 Nev.; Ore.; Wash.; Vanc. Island.
 Arizona; Wyo.; Mont.; Brit. Am.
 Southern California.
 Europe; Siberia; California.
 Montana; Minnesota; Brit. Am.

DEEBE

- Portlandi, Fabricius, 1781.
 Creola, Skinner, 1897.

States east of Rocky Mountains.
 Louisiana; Texas.

CHIONOBAS

- Macouni, Edwards, 1885.
 284. **Gigas**, Butler, 1868.
 285. **Nevadensis**, Felder, 1867.
 286. **Californica**, Boisduval, 1869.

Alberta.
 Vancouver Island.
 Nevada.
 Cal.; Ore.; east of Cascade Mts.

CHIONOBAS—continued.

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| 287. Iduna , Edwards, 1874. | Northwestern California. |
| Chryxus, Dbl.-Hew., 1851. | Utah; Colorado; Rocky Mountains. |
| -Calais, Scudder, 1865. | Hudson Bay; New Foundland. |
| 288. Ivalda , Mead, 1878. | Sierra Nevada, Alpine peaks. |
| Jutta, Hubner, 1800. | Arctic America. |
| -Alaskensis, Holland, 1900. | Alaska. |
| 289. Uhleri , Reakert, 1866. | Rocky Mts. of Colorado and Mont. |
| 290. Varuna , Edwards, 1882. | Arizona; Mont.; Brit. America. |
| Alberta, Elwes, 1893. | British America. |
| Norna, Thunberg, 1791. | Arctic America. |
| -Hilda, Quesnel, 1791. | Arctic America. |
| -Celeno, Hubner, 1794. | Arctic America. |
| -Bore, Hubner, 1825. | Arctic America. |
| -Pearlie, Edwards, 1897. | Victoria Land. |
| 291. -Subhyalina , Curtis, 1835. | Arctic America. |
| Taygete, Hubner, 1824. | Labrador. |
| Semidea, Say, 1828. | White Mts. of New Hampshire. |
| -Katahdin, Newcomb, 1901. | Mt. Katahdin, Maine. |
| 292. -Brucei , Edwards, 1891. | Colorado. |
| 293. -Beani , Elwes, 1893. | Colorado. |
| Dauria, Strecker, 1894. | Southeastern Arizona. |

Family **LIBYTHEIDÆ****LIBYTHEA**

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|---------------------------|------------------|
| Bachmani, Kirtland, 1852. | Atlantic States. |
| Carinenta, Cramer, 1779. | Texas. |
| -Larvata, Strecker, 1878. | Texas. |

Family **ERYCINIDÆ****LEMONIAS**

- | | |
|--------------------------------------|-----------------------------------|
| 294. Mormo , Felder, 1859. | Cal.; Utah; Arizona; New Mexico. |
| Duryi, Edwards, 1884. | New Mexico. |
| 295. Cythera , Edwards, 1873. | Arizona; New Mexico. |
| 296. Virgulti , Behr, 1865. | Southern California; Mexico. |
| 297. Palmeri , Edwards, 1870. | So. California; Utah; New Mexico. |
| 298. Nais , Edwards, 1876. | Arizona; Colorado; New Mexico. |
| 299. Zela , Butler, 1870. | Arizona; Mexico. |
| 300. Cleis , Edwards, 1882. | Arizona; Mexico. |

CALEPHEUS

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| Cænus, Linnæus, 1767. | Southern States. |
| 301. Borealis , Grote-Rob., 1866. | N. Y. to Va.; Mich.; Ill.; Cent. Cal. |
| 302. Australis , Edwards, 1877. | Arizona; Texas; Mexico. |
| 303. Nemesis , Edwards, 1871. | Southern California. |

Family **LYCENIDÆ****EUMÆUS**

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|-----------------------|---------------------------------|
| Atala, Poey, 1832. | Florida; Cuba. |
| Minyas, Hubner, 1806. | Texas; Mexico; Central America. |

ATLIDES

304. *Crysalus*, Edwards, 1873. Arizona; Utah; So. California.
 305. *-Citima*, H. Edwards, 1881. Arizona; Utah.
 306. *Halesus*, Cramer, 1779. U. S., south of North Lat. 40°.

THECLA

- M-Album, Ed.-Lec., 1833. Southern and Gulf States.
 Telea, Hewitt, 1862. Florida.
 Martialis, Herr.-Sch., 1864. Florida.
 Hugon, Godart, 1843. Florida.
 307. *Jada*, Hewittson, 1862. Arizona; Mexico.
 308. *Melinus*, Hubner, 1818. United States, except Alaska.
 Favonius, Sm.-Abb., 1797. Gulf States.
 Autolycus, Edwards, 1871. Texas; Missouri; Kansas.
 Alcestis, Edwards, 1871. Arizona; Texas.
 Acadica, Edwards, 1862. Northern States W. of Sierra Nev.
 309. *Californica*, Edwards, 1862. California and Nev. to Vanc. Is.
 310. *Dryope*, Edwards, 1870. California; Nevada; Utah.
 311. *Tacita*, H. Edwards, 1881. Cal., Lake Co., Greenhorn Mts.
 312. *Itys*, Edwards, 1884. Arizona.
 313. *Auretorum*, Boisduval, 1852. California.
 314. *Grunus*, Boisduval, 1852. California; Nevada.
 315. *Sylvinus*, Boisduval, 1852. California; Nevada.
 316. *Sepium*, Boisduval, 1852. States west of Rocky Mountains.
 Edwards, Saunders, 1869. Maine to Nebraska; Brit. Am.
 Wittfeldt, Edwards, 1883. Florida.
 Calanus, Hubner, 1806. Atlantic and W. States; Ontario.
 -Lorata, Grote-Rob., 1868. Atlantic and Western States.
 Ontario, Edwards, 1868. New England; Ontario.
 Liparops, Bdl.-Lec., 1833. States east of Mississippi River.
 Putnam, H. Edwards, 1876. Utah.
 317. *Tetra*, Behr, 1870. California.
 318. *Chalcis*, Behr, 1879. California; Utah.
 -Fulvescens, H. Edwards, 1876. California; Ore.; Washington.
 319. *Nelsoni*, Boisduval, 1869. Central and So. California.
 320. *-Exoleta*, H. Edwards, 1881. Central California.
 321. *-Muri*, H. Edwards, 1881. Central California.
 322. *Spinetorum*, Boisduval, 1867. Northern California; Ore.; Wash.
 323. *Spadix*, H. Edwards, 1881. Southern California.
 324. *Adenostomatis*, H. Edwards, 1876. California, north and south.
 325. *Blennia*, Hewitt, 1869. Vancouver Island; Arizona; Mex.
 Castalis, Edwards, 1871. Texas.
 Mirabelle, Barnes, 1900. Texas.
 Damon, Cramer, 1782. Atlantic and W. States; Tex.; Ont.
 -Discoidalis, Skinner, 1897. Texas.
 Simethis, Drury, 1770. Texas; Mexico; Central America.
 Acis, Drury, 1773. Southern Florida.
 Cecrops, Fabricius, 1793. Southern States.
 Columella, Fabricius, 1793. Florida; Texas; Mexico.
 Leda, Edwards, 1882. Arizona.

THECLA—continued.

326. *Clytie*, Edwards, 1877. Arizona; Texas.
 327. *Ines*, Edwards, 1882. Arizona.
 328. *Avalona*, n. s., Wright, 1905. Catalina Island.
 329. *Behri*, Edwards, 1870. Cal.; Nevada; Colo.; Oregon.
 Augustus, Kirby, 1837. Eastern States; British America.
 330. *Iroides*, Boisduval, 1862. Ariz.; Cal.; O.; Wh.; Vanc. Is.; B.C.
 331. *-Mossi*, H. Edwards, 1881. Vancouver Island.
 332. *Potis*, Strecker, 1878. Arizona.
 Irus, Godart, 1823. Atlantic and Western States.
-Arsace, Boisduval, 1833. Atlantic and Western States.
 Henrici, Grote-Rob., 1867. Northeastern Atlantic States.
 333. *Eryphon*, Boisduval, 1852. California; Colorado.
 334. *Nippon*, Hubner, 1823. Atlantic and W. States; N. Cal.
 335. *Dumetorum*, Boisduval, 1852. Cal.; Nevada; Colorado; Montana.
 336. *-Affinis*, Edwards, 1862. Cal.; Nevada; Utah; N. Arizona.
 337. *Apama*, Edwards, 1882. Arizona.
 Sheridani, Edwards, 1887. Montana; Colorado.
Læta, Edwards, 1862. E. States; N. J.; Canada to Ariz.
 Titus, Fabricius, 1793. New Eng. to Arizona; Brit. Am.

FENISECA

Tarquinius, Fabricius, 1793.

States east of Mississippi River.

CHRYSOPEANUS

338. *Arota*, Boisduval, 1852. California.
 339. *Virginiensis*, Edwards, 1870. California; Nevada; Colorado.
 340. *Hermes*, Edwards, 1870. California; Nevada.
 341. *Mariposa*, Reakert, 1866. California; Colo.; Mont.; Brit. Am.
 342. *Xanthoides*, Boisduval, 1852. California.
 343. *Gorgon*, Boisduval, 1852. California; Nevada.
 Dione, Scudder, 1869. Mississippi Valley.
 345. *Editha*, Mead, 1878. California; Nevada.
 Thoe, Boisduval, 1832. Eastern and Northern States.
 346. *Zerore*, Boisduval, 1869. California; Nevada; Colorado.
 347. *Del Sud*, n. s., Wright, 1905. San Diego County, California.
 348. *Helloides*, Boisduval, 1869. Cal.; Ore.; Wash.; Colo.
 349. *Dorcas*, Kirby, 1837. Alaska; British Am.; Labrador.
 Florus, Edwards, 1883. British America.
 Epixanthe, Bd.-Lec., 1833. Northern States; British Am.
 Hypophleas, Boisduval, 1852. Arctic America.
-Fieldeni, McLachlan, 1878. Arctic America.
 350. *Fullolus*, Hulst, 1886. States west of Rocky Mountains.
 351. *Cupreus*, Edwards, 1870. Northern California; Oregon.
 Snowi, Edwards, 1881. Colorado; Alberta.
 352. *Eubidus*, Behr, 1866. Oregon; Nevada; Montana.
 353. *Sirius*, Edwards, 1871. Arizona to Mont.; British Am.

LYCENA

354. *Fuliginosa*, Edwards, 1861. California; Nevada; Utah.
 355. *Heterones*, Boisduval, 1852. California; Nevada; Utah; Colo.
 356. *Clara*, H. Edwards, 1877. Southern California.

LYCENA—continued.

357. *Lycea*, Edwards, 1864. Colo.; Nev.; Mont.; Ariz.; N. M.
 358. *Fulla*, Edwards, 1870. California; Oregon; Wash.; Vanc.
 359. *Pheres*, Boisduval, 1862. Cal.; Or.; Wn.; B. Col.; Colo.; Ariz.
 360. *Icarioides*, Boisduval, 1852. California.
 361. *Dædalus*, Behr, 1867. Southern California.
 362. *-Maricopa*, Reakert, 1866. California.
 363. *Sapiolus*, Boisduval, 1852. Cal.; Nev.; Ore.; Wash.; B. Col.
 Amica, Edwards, 1863. British America.
 Pembina, Edwards, 1862. British America.
 364. *Phileros*, Boisduval, 1869. Cal.; Nevada; Utah; Arizona.
 Ardea, Edwards, 1871. Nevada.
 365. *Kodiak*, Edwards, 1870. Alaska.
 366. *Mela*, Strecker, 1900. Colorado; British Columbia.
 367. *Antiakis*, Boisduval, 1862. California.
 368. *-Behr*, Edwards, 1862. California.
 369. *-Mertila*, Edwards, 1866. Central California.
 370. *Xerxes*, Boisduval, 1852. Lone Mountain, California.
 371. *Orcus*, Edwards, 1869. Central California.
 Afra, Edwards, 1883. British America.
 Lygdamus, Doub., 1842. Middle States.
 372. *Oro*, Scudder, 1876. California; Colo.; New Mexico.
 373. *Sagittigera*, Felder, 1865. Wash.; Or.; Cal.; Idaho; Rocky Mt.
 374. *Sonorensis*, Felder, 1865. Southern California; Lower Cal.
 375. *Podarce*, Felder, 1865. California; Nevada; Colorado.
 Aquilo, Boisduval, 1833. Arctic America; Labrador.
 Rustica, Edwards, 1865. Colorado; Mont.; British America.
 376. *Enoptes*, Boisduval, 1852. California; Ore.; Wash.; Ariz.
 Glaucon, Edwards, 1871. Colorado.
 377. *Battoides*, Behr, 1867. California; Nevada; Colorado.
 378. *Shasta*, Edwards, 1862. Cal.; Ore.; Utah; Nev.; Mont.; Colo.
 379. *Melissa*, Edwards, 1873. Cal.; Ariz.; New Mex.; Colorado.
 380. *Acmon*, Dbl.-Hew., 1852. States west of Rocky Mountains.
 381. *-Chlorina*, Skinner, 1902. Southern California.
 381a. *-Neurona*, Skinner, 1902. Southern California.
 382. *-Melimona*, n. v., Wright, 1905. Southern California.
 Scudder, Edwards, 1861. Northern Middle States.
 383. *Lotis*, Lintner, 1879. Mendocino Co., California.
 Aster, Edwards, 1882. New Foundland.
 384. *Anna*, Edwards, 1861. Cal.; Nev.; Ore.; Colo.; Mont.
 385. *Amyntula*, Boisduval, 1852. W. Coast States f'm Mex. to Ar. Cir.
 386. *Herri*, Grinnell, 1901. Cochise Co., Arizona.
 387. *Annetta*, Mead, 1882. Utah.
 Argiolus, Sm.-Abb., 1797. Eastern United States.
 388. *-Lucia*, Kirby, 1837. Alaska; B. C.; B. A.; New England.
 -Marginata, Edwards, 1883. New England States.
 389. *-Violacea*, Edwards, 1866. Alaska; B. C.; B. A.; Colo.; N. E.
 -Nigra, Edwards, 1868. West Virginia; Colorado.
 -Cinera, Edwards, 1883. Atlantic States.

LYCENA—continued.

- Neglecta, Edwards, 1862.
 390. **Piasus**, Boisduval, 1852.
 391. —**Echo**, Edwards, 1864.
 392. —**Arizonensis**, Edwards, 1833.
 Gozora, Boisduval, 1870.
 Comyntas, Godart, 1823.
 393. **Monica**, Reakert, 1866.
 394. **Isola**, Reakert, 1866.
 395. **Gyas**, Edwards, 1871.
 Cyna, Edwards, 1881.
 397. **Hanno**, Stoll, 1790.
 398. **Speciosa**, H. Edwards, 1876.
 Ammon, Lucas, 1856.
 399. **Marina**, Reakert, 1868.
 400. **Sissona**, n. s., Wright, 1905.
 Theonus, Lucas, 1856.
 401. **Astragala**, n. s., Wright, 1905.
 Striata, Edwards, 1877.
 402. **Exilis**, Boisduval, 1852.
 403. **Isophthalma**, Her.-Schf., 1862.
- Northeastern States; Montana.
 California; Arizona; Mexico.
 So. California; Arizona; Mexico.
 Arizona.
 Arizona; Mexico.
 Atlantic States to Rocky Mts.
 Southern California.
 Colo.; New Mex.; Ariz.; Mex.
 Arizona.
 Texas.
 Gulf States; S. Cal.; Mex.
 Southern California.
 Southern Florida.
 So. California; S. Colo.; Ariz.
 Northern California.
 Florida.
 Southern California.
 Texas.
 Cal.; Ariz.; New Mex.; Colo.
 Florida; Georgia; S. California.

Family **HESPERIDÆ****PHOLISOBA**

- 403a. **Catullus**, Fabricius, 1793.
 Mexicana, Reakert, 1866.
 404. **Pirus**, Edwards, 1878.
 405. **Ceos**, Edwards, 1882.
 Hayhursti, Edwards, 1870.
 406. **Libya**, Scudder, 1878.
 407. **Alpheus**, Edwards, 1876.
 408. **Lena**, Edwards, 1882.
- United States, except Alaska.
 Arizona; Mexico.
 Colorado; New Mex.; Ariz.; Utah.
 Arizona; Mexico.
 Southern States.
 Southern California; Utah.
 Nevada; Arizona; New Mexico.
 Northern Arizona; Montana.

COPEODES

409. **Procris**, Edwards, 1871.
 410. —**Waco**, Edwards, 1868.
 411. **Candida**, Wright, 1890.
 412. **Wrighti**, Edwards, 1882.
 413. **Myrtis**, Edwards, 1884.
 414. **Eunus**, Edwards, 1881.
 415. **Arene**, Edwards, 1871.
- Arizona; New Mexico.
 Arizona.
 Southern California.
 California Desert.
 Arizona.
 California Mountains.
 Texas; Arizona.

THYMELICUS

- Garita, Reakert, 1866.
 Poweschlek, Parker, 1870.
 Edwardsi, Barnes, 1897.
- Colo.; Dakota; Brit. America.
 Iowa; Illinois; Colorado; Utah.
 Colorado.

PAMPHILA

- Massasoit, Scudder, 1862.
 —Suffusa, Laurent, 1892.
 Zabulon, Bdl.-Lec., 1833.
 Hobomok, Harris, 1862.
- E. and Middle States; Neb.; Colo.
 Eastern States.
 Middle and Southern States.
 Atlantic States.

PAMPHILA—continued.

- Pocahontas, Scudder, 1862.
 Taxiles, Edwards, 1881.
 416. **Buricola**, Boisduval, 1852.
 Comma, Linnaeus, 1758.
 417. **Juba**, Scudder, 1872.
 418. -**Viridis**, Edwards, 1883.
 419. **Manitoba**, Scudder, 1874.
 -**Manitoboides**, Fletcher, 1888.
 420. **Nevada**, Scudder, 1874.
 421. **Colorado**, Scudder, 1874.
 422. **Idaho**, Edwards, 1883.
 423. **California**, n. v., Wright, 1905.
 424. **Oregonia**, Edwards, 1883.
 -**Assiniboia**, Lyman, 1892.
 -**Laurentina**, Lyman, 1893.
 425. **Sylvanoides**, Scudder.
 426. **Columbia**, Scudder, 1872.
 Sassacus, Harris, 1862.
 Harpalus, Edwards, 1884.
 Pawnee, Dodge, 1874.
 Ottoo, Edwards, 1876.
 Lasus, Edwards, 1884.
 Cabelus, Edwards, 1881.
 Napa, Edwards, 1864.
 Scudderl, Skinner, 1899.
 Metea, Scudder, 1862.
 427. **Rhesus**, Edwards, 1877.
 428. **Carus**, Edwards, 1884.
 Uncas, Edwards, 1863.
 Licinus, Edwards, 1871.
 Attalus, Edwards, 1871.
 429. **Yuma**, Edwards, 1873.
 Snowl, Edwards, 1871.
 Leonardus, Harris, 1862.
 Meskel, Edwards, 1877.
 430. **Nemorum**, Boisduval, 1852.
 431. **Agricola**, Boisduval, 1852.
 432. **Milo**, Edwards, 1883.
 433. **Pratincola**, Boisduval, 1852.
 434. **Vernus**, Edwards, 1881.
 435. **Campestris**, Boisduval, 1852.
 Huron, Edwards, 1863.
 Stigma, Skinner, 1896.
 Morrisonl, Edwards, 1878.
 436. **Phyleus**, Drury, 1770.
 437. **Brettus**, Bois.-Lec., 1883.
 438. **Brettoides**, Edwards, 1883.

Northern States; Miss. Valley.
 Arizona; New Mex.; Utah; Nev.
 Central California.
 Europe; Siberia; North America.
 California; Colorado; Utah.
 Northern California; New Mex.
 Cal.; Wash.; Brit. Col.; Brit. Am.
 Ontario, Canada.
 Nev.; Colo.; Ariz.; B. C.; B. A.
 Colo.; Cal.; Oregon; Wash.
 Cal.; Ore.; Wash.; Brit. America.
 Southern California.
 California; Nevada; Brit. America.
 Regina, Canada.
 Quebec.
 California.
 California.
 Northern States.
 Nevada.
 Nevada; Montana.
 Nebraska; Oklahoma; Arizona.
 Arizona.
 Nevada; California.
 Colorado.
 Colorado.
 Atlantic States.
 Arizona; Colorado.
 Arizona; Texas.
 Middle States; Dakota; Brit. Am.
 Texas.
 Texas.
 Arizona.
 Colorado.
 Atlantic States.
 Florida; Texas.
 California.
 California; Nevada; Washington.
 Oregon.
 California; Washington.
 Southern California.
 Southern California; Ariz.
 Atlantic States; Mississippi Val.
 Texas; New Mexico.
 Colorado; Arizona.
 Mid. & Gulf States. w. to Sierra N.
 South Atlantic and Gulf States.
 S. At. & Gulf States; S. Cal.

PAMPHILA—continued.

439. **Chusca**, Edwards, 1873.
 Draco, Edwards, 1871.
 Otho, Smith-Abb., 1797.
 -Egremet, Scudder, 1862.
 Mystic, Scudder, 1862.
 Siris, Edwards, 1881.
 Mardon, Edwards, 1881.
 Cernes, Bdl.-Lec., 1833.
 Alcina, Skinner, 1893.
440. **Sabuleti**, Bolsduval, 1852.
441. **Chispa**, n. s., Wright, 1905.
 Pecklus, Kirby, 1837.
 Baracoa, Lucas, 1857.
 Verna, Edwards, 1862.
442. **Vestris**, Bolsduval, 1852.
 Metacommet, Harris, 1862.
443. **Bellus**, Edwards, 1884.
 Osyko, Edwards, 1867.
 Comus, Edwards, 1876.
 Eufala, Edwards, 1869.
444. **Arabus**, Edwards, 1882.
 Fusca, Grote-Rob., 1867.
 Oslari, Skinner, 1899.
445. **Nereus**, Edwards, 1876.
 Accius, Smith-Abb., 1797.
 Loamm, Whitney, 1876.
 Horus, Edwards, 1871.
446. **Deva**, Edwards, 1876.
447. **Lunus**, Edwards, 1884.
 Hianna, Scudder, 1868.
 Maculata, Edwards, 1865.
 Panoquin, Scudder, 1862.
 Panoquinoides, Skinner, 1891.
 Ocola, Edwards, 1863.
448. **Errans**, Skinner, 1892.
 Ethlius, Cramer, 1762.
449. **Pittacus**, Edwards, 1882.
 Rhena, Edwards, 1877.
 Bimaculata, Grote-Rob., 1867.
 Pontiac, Edwards, 1863.
 Manataqua, Scudder, 1862.
 Yehl, Skinner, 1893.
 Dion, Edwards, 1879.
 Arpa, Bois.-Lec., 1833.
 Pilatka, Edwards, 1867.
 Byssus, Edwards, 1880.

Arizona.
 Colorado; British America.
 At. States; Miss. Val.; Tex.; Ont.
 Atlantic States; Miss. Valley.
 Northern States, west to Dakota.
 Washington.
 Washington.
 N. U. S.; Mont.; Utah; Dak.; B. A.
 Colorado.
 California; Arizona; New Mexico.
 Sierra Nevadas of California.
 No. and Atlantic States; Ks.; Ont.
 Florida; Antilles.
 Middle States.
 Florida; California; Colorado.
 Eastern States, New Eng. to Mont.
 Southern Arizona.
 Gulf States.
 Texas; Colorado.
 Florida; Texas.
 Arizona.
 Gulf States.
 Colorado.
 Arizona.
 Gulf States.
 Florida; North Carolina.
 Texas.
 Arizona; Southern California.
 Southern Arizona.
 Atlantic States.
 Gulf States.
 Gulf States.
 Southern Florida.
 Gulf States.
 Central California.
 Gulf States.
 Arizona.
 Southern Colorado.
 Northern States.
 Massachusetts to Nebraska.
 United States; British America.
 Tennessee; Georgia; Florida.
 New York; New Jersey; Nebraska.
 Gulf States.
 Gulf States; Nebraska.
 Florida; Texas.

PAMPHILA—continued.

452. **Phylace**, Edwards, 1877. Southern Colorado; Arizona.
 Viator, Edwards, 1865. Atlantic and Gulf States.
 Carolina, Skinner, 1892. North Carolina.
 Vitellius, Fabricius, 1793. States east of Mississippi River.
 Streckerl, Skinner, 1893. Florida.
 Howardl, Skinner, 1896. Florida.
 Aaronl, Skinner, 1890. South Atlantic States.
 453. **Melane**, Edwards, 1869. Southern California.
 Lagus, Edwards, 1881. Texas; Colorado.
 Arogos, Bdl.-Lec., 1833. Gulf States; Nebraska; Iowa.

AMBYSCIARTES

- Vialis, Edwards, 1862. Maine; Mid. States; So. States.
 Nysa, Edwards, 1877. Texas.
 Eos, Edwards, 1871. Georgia; Florida.
 Cella, Skinner, 1895. Florida.
 Samoset, Scudder, 1862. No. and Middle States to Iowa.
 Aenus, Edwards, 1877. Tex.; Colo.; New Mex.; Ariz.
 454. **Simius**, Edwards, 1881. Colorado; Arizona.
 Cassus, Edwards, 1883. Southeastern Arizona.
 455. **Nanno**, Edwards, 1882. Arizona.
 Textor, Hubner, 1826. Gulf States.

CARTEOCEPHALUS

- Palemon, Pallas, 1771. Alaska; Labrador; New England.
 Dara, Kollar, 1848. Colorado? California?

ANCYLOXYPHA

- Numitor, Fabricius, 1793. Atlantic and Gulf States.
 Longleyl, French, 1897. Northern Illinois.

ENCYIDES

- Urania, West-Hew., 1852. Texas; Mexico.
 Lillea, Reakert, 1866. Texas; Mexico.
 Batabano, Lefebvre, 1867. Florida; Cuba.
 Amyntas, Fabricius, 1775. Florida; Arizona? Mexico.

ACHYLODES

- Thraso, Hubner, 1806. Tex.; Mex.; Cent. America; S. Am.

SYSTASEA

- Pulverulenta, Felder, 1869. Arizona; Texas; New Mexico.
 Stigmaticus, Mabilie, 1883. Arizona; Mexico.

PYRGUS

456. **Ericetorum**, Boisduval, 1852. New Mex.; Ariz.; Southern Cal.
 Macaria, Reakert, 1866. Arizona? Mexico.
 Domicella, Erichson, 1848. Arizona? Mexico.
 -Nearchus, Edwards, 1882. Arizona? Mexico.
 457. **Tessellata**, Scudder, 1872. Atlantic to Pacific.
 Montivagus, Reakert, 1866. Atlantic to Pacific.
 Centauræ, Rambur, 1839. Middle States.
 Philetas, Edwards. Texas.
 458. **Cœspitalis**, Boisduval, 1852. Cal.; Colorado; Nevada; Or.; Vanc.
 Xanthus, Edwards, 1877. Southern Colorado.

PYRGUS

459. *Scriptura*, Boisduval, 1852. California; Arizona; Montana.
 Nessus, Edwards, 1877. Texas.
 460. *Polingi*, Barnes, 1900. Arizona.

MISONIADES

- Brizo, Boisduval, 1833. States east of Rocky Mountains.
 Icelus, Lintner, 1872. States east of Mississippi River.
 Somnus, Lintner, 1881. Florida.
 Lucilius, Lintner, 1872. Middle and Western States.
 461. *Persesus*, Scudder, 1862. Atlantic to Pacific.
 Ausonius, Lintner, 1872. Middle States.
 Afranius, Lintner, 1878. Southern Colorado; Arizona.
 Martialis, Scudder, 1869. States east of Rocky Mountains.
 462. *Juvenalis*, Fabricius, 1793. Atlantic to Pacific.
 463. *Propertius*, Lintner, 1881. California.
 464. *Clitus*, Edwards, 1882. Arizona; Southern California.
 Petronius, Lintner, 1881. Southern Florida.
 Horatius, Scud.-Burg., 1870. Atlantic States.
 Terentinus, Scud.-Burg., 1870. Atlantic States.
 465. *Nævius*, Lintner, 1881. Florida.
 466. *Pacuvius*, Lintner, 1878. Arizona; New Mexico; Colorado.
 467. *Tatius*, Edwards, 1892. Arizona.
 468. *Funerals*, Scud.-Burg., 1870. Arizona; California.
 469. *Tristis*, Boisduval, 1852. California; Arizona.
 470. *Tibullus*, Scud.-Burg., 1870. California.
 Plautus, Scud.-Burg., 1870. Florida.

EUDAMUS

471. *Pyllades*, Scudder, 1870. Atlantic States; Dak.; Colo.; Cal.
 472. *Mexicana*, Herr.-Schaf., 1868. Tex.; Ariz.; Colo.; California.
 Proteus, Linnæus, 1758. Atlantic States.
 Simplicius, Stoll, 1791. Tex.; Ariz.; Mex.; Cent. Am.; S. A.
 Dorantes, Stoll, 1793. Texas.
 Albofasciatus, Hew., 1867. Texas; Arizona; Mexico.
 473. *Dorus*, Edwards, 1882. Arizona; Mexico.
 Zilpa, Butler, 1901. Mexico; South America.
 Alcaeus, Hewitson, 1901. Mexico; South America.
 474. *Tityrus*, Fabricius, 1775. Atlantic to Pacific.
 Melon, God.-Salvin, 1893. Mexico.
 Cellus, Bois.-Lec., 1833. South Atlantic States.
 Hesus, West.-Hew., 1852. Texas; Mexico.
 Zestos, Hubner, 1832. Florida; Mexico.
 475. *Idas*, Cramer, 1782. Arizona.
 Lycidas, Sm.-Abb., 1797. Atlantic States.
 Epigona, Herr.-Schaf., 1868. Texas; Mexico.
 Coyote, Skinner, 1892. Texas.
 476. *Drasius*, Edwards, 1883. Southern Arizona; Mexico.
 Outis, Skinner, 1894. Texas.
 Hippalus, Edwards, 1882. Arizona; Mexico.
 477. *Calculus*, Herr.-Schaf., 1868. Arizona; Mexico; So. California.

EUDAMUS—continued.

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| 478. Emilia , Skinner, 1893. | Oregon. |
| 479. Python , Edwards, 1882. | Southern Arizona. |
| Bathyllus, Sm.-Abb., 1797. | South Atlantic States. |
| Electra, Lintner, 1881. | Ontario, Canada. |
| 480. Lacustra , n. s., Wright, 1905. | Central California. |

Family MEGATHYMIIDÆ

PTEROPHYGA

- | | |
|--------------------------------------|-------------------|
| 481. Araxes , Hewitson, 1867. | Southern Arizona. |
| 482. Cestus , Edwards, 1884. | Southern Arizona. |

MEGATHYMUS

- | | |
|--|---------------------------------|
| Yuccæ, Bois.-Lec., 1833. | Southern Arizona. |
| Cofaqui, Strecker, 1876. | Colorado. |
| Streckeri, Skinner, 1895. | Colorado; Texas; Arizona. |
| 483. Neumogeni , Edwards, 1882. | Arizona; Mexico; S. California. |
| 484. Ursus , Poling, 1902. | Arizona. |

APPENDIX

Day-flying Moths

- | | |
|--|----------------------|
| 485. Hemileuca Nevadaensis , Stretch, 1872. | Nevada. |
| 486. Hemileuca Californica , Wright, 1876. | Southern California. |
| 487. Hemileuca Electra , Wright, 1884. | Southern California. |

LIST OF NEW SPECIES AND NEW VARIETIES

Herein First Published and Illustrated

Date of Publication, October 10, 1905

10. <i>Parnassius Niger</i> , n. v.,	Sierra Nevadas of California.
12. <i>Parnassius Magnus</i> , n. v.,	British Columbia.
25. <i>Papilio Coloro</i> , n. v.,	Colorado Desert of California.
60. <i>Anthocharis Deserti</i> , n. v.,	Colorado Desert of California.
67. <i>Anthocharis Mollis</i> , n. v.,	Southern California.
70. <i>Anthocharis Callente</i> , n. s.,	Colorado Desert of California.
111. <i>Argynnis Letis</i> , n. v.,	Northern California.
134. <i>Argynnis Laurina</i> , n. v.,	Southern California.
160. <i>Melitæa Olancha</i> , n. s.,	Sierra Nevadas of California.
163. <i>Melitæa Sierra</i> , n. s.,	Sierra Nevadas of California.
170. <i>Melitæa Augustina</i> , n. v.,	Southern California.
178. <i>Melitæa Eremita</i> , n. s.,	Central California.
179. <i>Melitæa Hermosa</i> , n. s.,	Southern Arizona.
180. <i>Melitæa Colonia</i> , n. s.,	Southern Oregon.
181. <i>Melitæa Sabina</i> , n. s.,	Catalina Mountains, Arizona.
183. <i>Melitæa Abnorma</i> , n. v.,	Sierra Nevadas of California.
184. <i>Melitæa Mirabilis</i> , n. v.,	Hills of Central California.
186. <i>Melitæa Leona</i> , n. v.,	Central California.
189. <i>Melitæa Cerrita</i> , n. s.,	Southern California.
198. <i>Phyciodes Pascoensis</i> , n. v.,	Eastern Washington.
212. <i>Synchlœa Californica</i> , n. s.,	Colorado Desert of California.
222. <i>Grapta Chrysoptera</i> , n. s.,	California.
249. <i>Satyrus Stephensi</i> , n. s.,	California; Oregon.
328. <i>Thecla Avalona</i> , n. s.,	Catalina Island.
347. <i>Chrysophanus Del Sud</i> , n. s.,	Southern California.
382. <i>Lycæna Mellmona</i> , n. v.,	San Bernardino Mountains, Cal.
423. <i>Pamphila Californica</i> , n. s.,	Southern California.
441. <i>Pamphila Chispa</i> , n. s.,	Sierra Nevadas, Cal.
480. <i>Nisoniades Lacustra</i> , n. s.,	Lake County, California.

LIST OF SOME OLD BUT GENERALLY UNKNOWN SPECIES, HEREWITH ILLUSTRATED OR DESCRIBED

28. <i>Papilio Pergamus</i> .	282. <i>Cænonympha Brenda</i> .
36. <i>Pieris Flava</i> .	383. <i>Lycæna Lotis</i> .
55. <i>Euchlœa Hyantis</i> .	397. <i>Lycæna Hanno</i> .
63. <i>Anthocharis Thoosa</i> .	403. <i>Lycæna Isophthalma</i> .
73. <i>Meganostoma Bernardino</i> .	408. <i>Pholisora Lena</i> .
74. <i>Meganostoma Amorphe</i> .	414. <i>Copæodes Eunus</i> .
85. <i>Collas Barbara</i> .	438. <i>Pamphila Brettoides</i> .
155. <i>Melitæa Quino</i> .	

THE BUTTERFLIES OF THE WEST COAST



THE BUTTERFLIES OF THE WEST COAST

Description of all the species of butterflies of the West Coast and of the illustrations on Plates I to XXXII, with notes in general and in particular as to the occurrence, habits, etc., of each species.

In order to save tedious repetition of facts for each species, general statements are made under the genus heading, which are generally applicable to all the species included in that genus, as all the species of a genus usually have the same habits.

Each figure in the plates is pedigreed as to the place and date of capture, and the name of the collector.

Genus PARNASSIUS

This is a race of butterflies widely distinct from any other kind; low and moth-like in some of its stages, but grouped near the Papilios because of the venation, in the absence of the inner vein. All Parnassians are white, except one or two which are more or less yellowish; of medium to large in size; thick-bodied; and of slow and deliberate flight. They feed on flowers, but their life in the imago state is short. They live in cold or cool climates, most of them inhabiting the Arctic regions, or the higher mountains of temperate climes, as the Rocky Mountains, and the Sierra Nevadas.

When we first see a Parnassian it is climbing up a plant-stem, limp-winged and unable to fly. If it be a female, mating takes place at this time, usually before she can fly, and during the lengthy mating process the curious abdominal pouch is formed. Unmated females have no pouch; males never have any; nor has any other butterfly in the world. This appendage is formed from

a frothy secretion, but from which individual is not known; it is at first soft and white, frothy and translucent, but soon becomes hard; in the *Clodius* group it is very large, and remains white after hardening, and in the *Smintheus* group it is small, and in hardening becomes brown and horn-like. The office or use of the pouch is apparently to prevent a repetition of mating.

The eggs are oviposited singly, wherever it happens, without care for a food-plant for the young larvæ. The larvæ are solitary and nocturnal, feeding by night and lying secreted by day, so that the larval habits and food-plants are not readily observed. At pupation the chrysalis is hidden away under dead leaves or rubbish, attached to some upright twig in some little place where there is room for it to swing. Hibernation takes place at this stage.

1. *Parnassius Clodius*.

PLATE I; Figures 1, b, c.

Fig. 1, Male, Goldstream, Vancouver Island, July 1, 1891;
Author.

b, Female, Goldstream, Vancouver Island, July 2, 1891;
Author.

c, Pouch of the female.

Clodius is the largest of the *Clodius* group, as it is also the darkest in color, the dark markings and the translucent margins being heavier than in any other species. On hind wing near anal angle is a dark patch, or perhaps two patches fused together, but without any red in them, and along the margin of hind wing are a series of curved markings which are darker than in any other of the group. There are two round red spots on each hind wing, and usually the outer one is twinned or has a secondary small one on the inside of the larger one.

The female is larger than the male, and all the spots and markings are heavier.

Sex-marks: The male has whitish hairs on the body, while the female body is black and shiny, and without hairs; also, after mating, the female has the so-called pouch on the underside of the body.

Food-plants: Supposed to be *viola*; probably also some other plants, as *sedum*; and possibly *vaccinium*, or dewberry.

Habitat: *Clodius* flies from the southern point of Alaska to Vancouver Island, and along the coast nearly to San Francisco;

also in the Sierra Nevadas at from 5,000 to 10,000 feet elevation, south as far as Lake Tahoe.

2. **Parnassius Clarius.** Elsewhere illustrated only in Edwards' Butt. N. A.

PLATE I; Figures 2, b, c.

Fig. 2, Male, Emigrant Gap, Cal., July 25, 1892; Author.

b, Female, Lake County, Cal., June 1894; Author.

c, Pouch of the female, Summit, Cal., 1892; Author.

Clarius averages a little smaller than Clodius, and is lighter in color, there being fewer dark markings; and the red spots are smaller, and never twinned; the hind wings are nearly free from dark markings, except the comma spot near anal angle.

No member of the Clodius group ever has any red on the upper side of fore wing.

Sex-marks as in Clodius.

Larval food-plants, and stages are probably the same as in Clodius.

Habitat: Clarius inhabits chiefly the higher mountains of California, from the Siskiyou Mountains of Northern California south to as far south as any Parnassian flies; it is not often seen in the interior mountains, nor ever, so far as I know, on the coast mountains; and this female example, taken in the mountains of Lake County, is an exception, not in appearance, but in locality.

3. **Parnassius Altaurus.** Not elsewhere illustrated.

PLATE I; Figures 3, b.

Fig. 3, Male, Eastern base Sierra Nevadas, July 27, 1892; Author.

b, Female, Vancouver Island, July 1, 1891; Author.

Altaurus is a Clarius with the red spots paled to orange or yellowish, the same as Behri in the Smintheus group. This form, although but recently named (in 1902) has been observed for many years, and I had in former years often wondered that this orange-spotted form should be unnamed while the same thing in the Smintheus group was named, and considered a good variety.

This form, with preceding Clarius and following Menetriesi and Baldur, are often spoken of as mere varieties of Clodius. This is a matter of individual opinion; my present effort is to show each form as I find it, and every student can class them as species or as varieties, as he pleases. Even as varieties, each form is entitled

to a distinctive name. But it should be borne in mind that they are variations of infinite degree, only a few being well marked, the most of them being so indefinitely marked that it is puzzling to assign them either to the one name or to the other.

4. **Parnassius Menetriesi.** Not elsewhere illustrated.

PLATE I; Figures 4, b, bb.

Fig. 4, Male, Emigrant Gap, Cal., June 25, 1892; Author.

b, Female, Lake Tahoe, Cal., July 10, 1892; Author.

bb, Female, Lake Tahoe, Cal., July 10, 1892; Author.

Smaller than *Clarius*; the dark markings of fore wings pale, but not obsolescent; hind wings of male like those of *Clarius*; of the female with some dark along the margin; in both sexes the red spots are small, the outer ones twinned in the female, and in all of them in both sexes the red is pale and inclined to pink or orange.

I figure two examples of the female, showing variations. All of these examples were taken in the typical habitats where the Author, Mr. H. Edwards, captured his types of this form, and I am not aware that any similar ones have been taken anywhere else, though very likely some may have been taken elsewhere.

5. **Parnassius Baldur.**

PLATE I; Figures 5, b, c.

Fig. 5, Male, east base Sierra Nevadas, July 27, 1892; Author.

b, Female, summit Sierra Nevadas, July 30, 1892; Author.

c, Female, underside, Sierra Nevadas, July 30, 1892; Author.

Baldur is same size as *Clarius*, but the base of all wings is darker, and the red spots are larger, and twinned, or with at least a small black dot inside the outer red spot of the female hind wings. There is always much red in the black spot near anal angle of hind wings, and on the underside the red is more obvious than on the upper, as shown in Fig. c. The male also usually shows a little red on the underside of the wings, near anal angle, but it does not show on the upper side of the wings, and so is not seen in the plate.

As I see these varieties, *Baldur* appears the best of the lot, and I think that it may well be called a full species.





6. *Parnassius Hermodur*.

PLATE II; Figures 6, b, c, d.

Fig. 6, Male, Mts. of Central Montana, June, 1890; Author.

b, Female, Mts. of Central Montana, June, 1890; Author.

c, Female, underside, Mountains of Central Montana,
June, 1890; Author.

d, Female, side view of the body, showing the pouch.

Hermodur is the chief variety of the *Smintheus* group, as that species and group are now generally regarded; it is, in fact, so prominent and consistent that it might well be called the stock from which *Smintheus* and all the forms of *Smintheus* have sprung. But *Hermodur* was unfortunately not recognized till thirty-four years after *Smintheus* was found and named, and so it naturally fell into second place, its rights not being duly appreciated. It is not, perhaps, so widespread as *Smintheus*, but where it prevails it is often present in great numbers, and it has the other features that should characterize the stem of a series of variable forms, namely, a constancy in markings everywhere, and especially an absence of variations among the members in its metropolis. I regard *Hermodur* as the stem of the group and have therefore placed it first on the plate. The male *Hermodur* has never been named.

Hermodur does not appear on the immediate Pacific Coast, except perhaps slightly in British Columbia, but it chiefly inhabits mountain ranges of moderate height, isolated and "island" mountains, from Colorado, through Montana, and into Canada on both the eastern and the western sides of the Rocky Mountains.

In the higher and colder localities of its habitat it is inclined to be yellowed a little; specimens from Yellowstone Park and from other more northern places are quite yellowish.

The preliminary stages have not yet been fairly worked out, as explained under the genus heading; and the larval food-plant is also not determined.

7. *Parnassius Smintheus*.

PLATE II; Figures 7, a, b.

Fig. 7, Male, Sierra Nevadas of Cent. Cal., June, 1890;
Author.

a, Male, underside, Sierra Nevadas of Cent. Cal., June, 1890; Author.

b, Female, Helena, Montana, July 20, 1891; Author.

Smintheus was named in 1847, being the first Parnassian of America to be named. The males of all the members of the Smintheus group have all wings nearly covered with opaque white scales, so that the wings are not so translucent as those of the Clodius group preceding; but the wings of the females, while darker, are more translucent than those of the males, and the dark scales are so arranged that the females have a spotted appearance. Smintheus females are rather inclined to show variations of different kinds; all of them have some red spots on the fore wings, two, three, four, or five of them. The pouch of all females of the Smintheus group is small and dark, and rather inconspicuous; the perfectly fresh female having no pouch at all until after mating.

The sex is sufficiently indicated by the difference in the color of the wings, as shown on the plate, as also by the pouch, when it is present, as it is sure to be, for the males never omit an opportunity.

Habitat: The Rocky Mountains, from Colorado far north into British Possessions, and west to the Sierra Nevadas of California.

8. *Parnassius Behri*.

PLATE II; Figure 8. Male, Sierra Nevadas of California, July 3, 1892; Author.

Behri is that rather common variety of Smintheus where the red spots on hind wings are yellowish or orange instead of red. The variety is found in both sexes, though more often in the female than in the male; it is variable, the yellowish tint often being only faintly perceptible, and, again, the round spots are more or less white instead of orange, and so grading into the next variety, Sayi. A large per cent of both Behri and Smintheus have white pupils in the red and orange spots.

Sex-marks and food-plants are the same as in Smintheus.

Habitat: Utah, Nevada, and the Sierra Nevadas of California, at an elevation of at least 5,000 feet.

9. *Parnassius Sayi*.

PLATE II; Figure 9. Sierra Nevadas, near Lake Tahoe, July 10, 1892; Author.

This variety of *Smintheus* is, according to the books, founded on those *Smintheus* females that have the round spots on hind wings mostly white instead of red; the figure gives us a good example. Nearly all of these white-spotted examples have the spots of under side more white than on upper side.

Eggs, sex-marks, food-plants, and habitat, as in previous numbers.

10. *Parnassius Niger*, n. v. Not elsewhere illustrated.

PLATE II; Figure 10. Male, Summit, Cal., July, 1892;
Author.

This variety of *Smintheus* is in the male, only, and is founded on the form here illustrated, where the red on all the wings is absent, and only black appears, no red being present, even near the body on the underside. This individual was found by the Author, as a larva, probably nearly or quite mature, on the high mountains, as stated above, and taken home to Southern California, where the imago emerged the following spring. The climate at Summit is severe, the altitude being over 7,500 feet, and snow and ice prevail for many months; the chrysalis, then, was wintered in a warm climate, where it did not experience any cold weather at all, but whether such a modification of environment caused the unusual markings, no one at present can tell. To rear larvæ on strange food, and in very extraordinary environment, as in dark, or cold, quarters, is known to vary the resulting imagines, making them darker. But we can scarcely expect a bleaching effect from wintering a chrysalis in a warm climate. The facts go to show, therefore, a genuine variety.

In the absence of red spots on hind wing of the male, *Niger* is like *Nanus*, but *Nanus* has a "prominent discal spot" which *Niger* has not, and *Niger* is much larger than *Nanus*. Whatever other differences there may be, except the wide difference of latitude between the home of *Nanus* and that of *Niger*, I know not. The difference in latitude is twelve degrees, or over 800 miles in a right line.

11. *Parnassius Sedakovi*.

No figure.

This variety is a southern variety of the endless variations of *Smintheus*, and was noticed at an early date, and described in 1855, by Menetries. It is now often ignored by some among those

writers who did not themselves name it, but doubtless it is as good a variety as some of those that are not omitted, as Behri, Sayl.

Sedakovi is found in Colorado, and possibly in the mountains to the north of Colorado. It is rather small in size, being about two to two and a half inches in expanse; the female is dark, like Hermodur, has no red on fore wing, but usually has red on hind wings, after the ordinary *Smintheus* style. This form is very likely to be found on the eastern side of the Sierra Nevada Mountains, and therefore is included in the fauna of the West Coast.

12. *Parnassius Nanus*.

No figure.

I have never seen an example of *Nanus*, nor a figure of one; it is described as being the smallest *Parnassian* in America, being only one and three-fourths to one and seven-eighths inches in expanse, which is much smaller than any figured in this book. I can therefore only quote the description as I find it in the books: That *Nanus* is of the *Sedakovi* type, "only more pronounced"; the male has no red on either wing, and has a prominent discal spot on hind wing. The female is after the *Hermodur* type, dark; has on costal of fore wings two faded red spots; on hind wings are red ocelli with whitish centers.

Like *Sedakovi*, *Nanus* is from the Rocky Mountains, the type being from near Calgary, on the eastern slope of the mountains, taken about 1892; and it is stated that it has also been taken at Spence's Bridge in British Columbia, on the western slope of the mountains, and so coming within the territory covered by this work.

13. *Parnassius Magnus*, n. v. Never before illustrated.

PLATE II; Figures 13, 13b.

Fig. 13, Male, Enderby, B. C.; collector unknown; 1880 (?).

13b, Female, Enderby, B. C.; collector unknown; 1880 (?).

This pair was given to the Author at the museum at Victoria, Vancouver Island, by the curator there, in July, 1891. The exact date of collection is unknown. Both of the specimens were broken, and have been mended. As the specimens stood in the case in the museum, I recognized the strangeness of them, and the curator kindly gave them to me, to my great joy.





This is the largest known variety of *Smintheus*, and I therefore call it *Magnus*; it is also one of the most northern in habitat, being in this respect exceptional, as the more northern forms are usually the smaller. The male is darker on fore wings than any other form of the *Smintheus* group. The female is also very large and dark, and with very large red spots, and the discal spots are with a white spot off from the center towards the outside.

14. **Parnassius Eversmanni.** Not elsewhere illustrated, except in Edwards' Butt. N. A.

PLATE II; Figure 14.

This figure is a photographic reproduction of a lithograph plate issued in the *Butterflies of North America*, an expensive work, in 1874. The example from which the lithograph was made was taken on the Yukon River, 200 miles below Fort Yukon, by Lieut. Dall, June 15, 1864 (?). It is unique to this day, no others having been taken since that time, that have ever been heard of. Very likely it may be common enough in suitable localities, but, judging from my experience among the butterflies, the banks of a river is a very unlikely place to find Parnassians; and, if one specimen can be taken there, it is probable that there are plenty more in some more suitable locality.

Thor is the name of a dimorphic female of *Eversmanni*, two of which were taken at the same time and place as *Eversmanni*. It has never been figured; but is said to be white, instead of yellow, and that it has golden-yellow hairs on the body, and some golden color at the base of the wings. Further than that I have never seen any description of it.

15. **Parnassius Nomion.**

No figure.

Nomion is said to have been taken at St. Michaels, Alaska, in the old days, before that territory became an American possession, but no one has taken it since, that I know of; although a good American collector, Mr. Nelson, was located there for several months, on purpose to make collections, on account of the Smithsonian Institution at Washington. The species has been figured two times, in Europe, but never in this country.

Genus PAPILIO.

Papilios—the “swallow-tailed butterflies”—cover the world. In the tropics they abound in countless millions, of large size and in gorgeous colors; in the Arctic they are also found, but of modest size and subdued colors; and in the temperate regions they are everywhere abundant, but never so brilliantly colored as in the tropics. In the United States there are no species that are notable for beauty.

The West Coast Papilios are especially modest in their size and colorings; none are notable for beauty—yellow and black, black and yellow, with a touch of blue or of red, that is all.

All Papilios are six-footed.

The caterpillars of Papilio have sixteen legs; some of them have soft, retractile, orange-colored scent-organs, which when at rest are hidden in the first segment behind the head. The larval life is about thirty days, the caterpillar frequently remaining hidden in a rolled-up leaf a good part of the time; in chrysalis it remains from ten to fifteen days, or perhaps hibernates in that state, to emerge early in the next spring.

Sex-marks: The males are smaller, brighter, and lighter colored than the females, and have a pair of claspers at the tip of the body, which somewhat resemble a pair of clam-shells; while the female is larger, stouter of body, and the tip of the body lacks the claspers, and tapers to a blunt point.

16. *Papilio Daunus*.

PLATE III; Figure 16. Male, Santa Rita Mountains, Southern Arizona, June, 1887; Author.

Daunus is the largest and finest *Papilio* that flies west of the Rocky Mountains. Its most peculiar feature is the three tails that adorn each hind wing. *Daunus* is not after all a full-fledged West Coast butterfly, as it does not come into the coast regions proper west of the Sierra Nevada and Coast ranges of mountains, evidently not much liking the cooler and damper sea air of the more immediate coast, but keeps to the eastward of these ranges, preferring the warmer and dryer air of the interior, semi-desert country. It inhabits the vast regions of the Great Basin, from the Rocky Mountains on the east to the Nevadas on the west, and from Canada on the north to far into Mexico on the south.

I have taken fine specimens near Spokane, and also in the Santa Ritas, near the Mexican border, and it may be found in limited numbers over all those vast semi-arid, intermediate regions; but I have never seen it abundant in any locality. One of my notes reads that the larger and finer examples come from northern rather than the southern localities. In flight it is tireless; it seems never to stop to feed or to rest, but is always in rapid flight, and consequently it is difficult to capture. And when at length you do succeed in taking one, the chances are that one or more of its tails will be missing, and that therefore it is useless.

Sex-marks, as explained under genus heading.

Larval food-plants: Plum, cherry, the rubus group of plants, and probably many desert plants of same order, such as heteromeles, cratægus, fragraria, and many others.

17. *Papilio Eurymedon*.

PLATE III; Figure 17. Female, Greenhorn Mountains, Cal., 7,000 feet altitude; June, 1888; Author.

Eurymedon is a mountain butterfly, frequenting the mountain slopes and canyons, up to about 8,000 feet altitude, but never coming down to the low-lying plains and valleys, except occasionally in the more northern parts of its range. It is a good feeder, and likes to feed on the tall blossoms of the cnicus thistle, as they sway in the wind, and also on the more humble horse-mints, the brodiaëas, and gillias, all of them plants beloved of the butterflies. When you see *Eurymedon* flying, though you want it ever so much, you may better let it go, and save your legs, for you will not catch it; but when it is feeding, or when at water, it is approachable, and then is readily taken.

In the north, it is darker than in the south, has shorter wings, and the tails are broader. When living, and in flight, the tails are usually twisted, as shown in the plate; probably, indeed, always so.

Sex-marks: The anal claspers; the males are smaller, and more lightly colored than the females.

Larval Food-plant: *Rhamnus Californica*, or California Coffee-bush. At present there is no other known food-plant.

Habitat: All States west of the Rocky Mountains, to the Pacific Ocean; and from Mexico north far into Canada, on both the eastern and the western slopes of the mountains.

18. Papilio Albanus.

No figure.

This is said to be the high mountain form of Eurymedon, "smaller in size, of clearer white ground-color; tails long and narrower; marginal spots nearer the margin." The facts are that Eurymedon, of any form that I have ever met, seldom comes lower down than 2,000 feet, in California; possibly it may fly at lower altitudes in the north; and in the mountains about Lake Tahoe it flies plentifully enough at 10,000 feet, at which locality I have taken them, and apparently they would go far higher, if there were any peaks for them to fly upon; and from my examples, from widely different places, the characters given above do not hold good, and I consequently regard this varietal name as of little or no value.

19. Papilio Rutulus.

PLATE III; Figure 19. Southern California, May, 1885;
Author.

Rutulus is the common and well-known yellow swallow-tail of the West Coast. It has a wide range north and south, from Alaska to Mexico, and from west to east as well, flying from tide-water of the Pacific Ocean to the Rocky Mountains of Colorado.

It is essentially a plains species, living in the valley low-lands, and flying about the willow copses, and along the banks of streams where the water-willows grow, for it is upon the willow leaves that the eggs are laid, and upon which the caterpillars feed; and the fine, great butterfly goes sailing up and down the willow-bordered lanes, as luxuriously as though it owned the country; as if, like Crusoe, it was monarch of all it surveyed, a grand butterfly; yet, although they like to strut and to show off their ample wings, they like as well to feed on the wild blossoms, or on the flowers of the cultivated alfalfa, so that they are not very difficult to take, when once you know their ways.

The eggs are laid singly on the underside of young willow leaves, and as soon as the caterpillar is large enough, it draws the edges of the leaf together with threads of silk, and so forms a tube or cone in which it lies hidden all the time, only poking its head out to feed. On this account the larvæ are difficult to find.

Sex-marks, as already explained.

Food-plant: Willow.

20. Papilio Arizonensis.

PLATE III; Figure 20. Female; from W. H. Edwards, 1885.

Arizonensis is a variety of the West Coast Rutulus, the markings being emphasized and otherwise modified by the influence of the arid, semi-desert environment. This form is found only in the higher mountains of Southern Arizona, the Catalinas, Santa Ritas, and perhaps some others, and at rather high elevations.

21. Papilio Ammoni.

No figure.

This form of Papilio was described by Behrens (not Behr) as a variety of Rutulus. I have never had a specimen of Ammoni, and cannot, therefore, illustrate it. The description reads: "A very peculiar form, in which the ground color of all the wings is of deep but rather dull orange color, and the bands and marks of the upper side are all rather broader and more distinct than in the normal Rutulus. The orange color prevails also on the under side, though a little mottled with lighter shades. Four specimens, male and female. Nevada." No mention was made of date, nor was any particular locality named. But the Author of this book was at that time well acquainted with Mr. Behrens (since deceased), and corresponded regularly with him, and knew generally of his goings and comings, in the butterfly pursuit, and therefore feels warranted in saying that doubtless Ammoni was taken near Reno, Nevada, in 1886 or 1887.

Now Nevada is not all a desert country, but it may be classed as semi-desert, and give no offence to the residents thereof. Ammoni, we may therefore call the desert variety of Rutulus, deeper in yellow coloring, but not differing in any other way. I am thus somewhat particular in speaking of Rutulus and Ammoni, because further along you will find a case similar, in another group of Papilios when I come to speak of Zolicaon, and Coloro, its desert variety, with illustrations of both forms.

22. Papilio Machaon.

No figure.

The European species Machaon, which inhabits the more northern parts of Europe and Siberia, is said to live also in Alaska, at St. Michaels and elsewhere. I have never taken the species, and will only say that it is very much like Zolicaon, being a little

larger, and with shorter tails, if we may judge from the illustrations of it, for it has been figured many times in European publications.

23. *Papilio Aliaska*.

No figure.

Aliaska has never been figured that I know of; nor have I ever seen a specimen. It is usually accounted as a variety of *Machaon*, but wherein it differs I do not know. It is said to live in Northwestern America, from Puget Sound northward, but as to any particular locality history is silent.

24. *Papilio Zolicaon*.

PLATE III; Figure 24. Male, Tallac Peak, 10,000 feet altitude, July 26, 1892; Author.

Zolicaon is what may be called an unlimited butterfly, flying everywhere throughout the country west of the continental divide, both north and south, and high and low, always in order. I have taken it near the Mexican line, and at Wrangel, Alaska, and very likely it goes to the Arctic Circle, on the Yukon. The more northern specimens are smaller and darker than the southern; the ocelli are more red north and paler south, and the pupil of the ocelli is larger south and smaller and elongated north.

This figured specimen I took on the top of Tallac Peak, where it was frolicking about the topmost rocks and acting as though it would like to fly a few thousand feet higher if there were only some rocks up there for it to alight upon. But *Zolicaon* is just that kind of a bird; it likes to get to the top of a hill and then amuse itself by chasing other butterflies away, and playing the bully generally. It is the way it is built. But although it flies at such great heights, it flies also at tide level, and all over the hills and lower mountains, at home anywhere and everywhere, if only its larval food-plant, the umbellifera, be present. *Zolicaon* varies greatly in size, from 2 inches to 3½ in expanse.

25. *Papilio Coloro*, n. v. Not elsewhere illustrated.

PLATE III; Figure 25. Colorado Desert of Southeastern California, June, 1883; Author.

I figure herewith a new form of *Papilio*, closely allied to *Zolicaon*, but of deep yellow color, so peculiar as to deserve a separate varietal name; I therefore call it *Coloro*, from the Colorado



Desert, which is its home. This specimen was taken by me in June, 1883, over a quarter of a century ago, since which time it has stood in my cabinet, awaiting this opportunity to be seen by the public.

Colorado apparently bears the same relation to *Zolicaon* as *Ammoni* to *Rutulus*, as previously related. As indicated by these two cases of *Ammoni* and Colorado, the desert environment causes a deepening of the ground color; though in ornithology and in mammalogy the accepted belief is that a desert habitat causes a paling of the color of its inhabitants. But such a discussion is not in place in this book. Here I will figure things as I find them, and others may discuss things, if they wish to do so.

26. *Papilio Oregonia*.

PLATE III; Figure 26. Female; sent me by W. H. Edwards, in 1886; specimen taken in Eastern Washington.

As you see by the plate, this is similar to *Zolicaon*, but is larger in size and lighter in color; the tails are twice as broad, and the ocelli are different in construction, and there are other differences, as you see by the plate, which is a direct photograph from the insects themselves. To understand this matter well the student should have a series of these different forms, to place them alongside each other, for there are some little variations that cannot be averaged unless you have a series of them.

To those who, like the author, have had some experience in breeding butterflies, the fact that the insects under discussion do or do not use the same larval food-plant, has great weight. Now *Zolicaon* larvæ feed on *daucus*, or plants of the carrot family, and *Oregonia* larvæ feed on *artemisia*; each kind of larvæ refusing to eat the other plants even though they starve to death. This fact alone is sufficient to prove to the student that they are separate species, for it is a matter of life or death to the butterflies.

This specimen here figured was sent me by that valiant captain in American butterflies, Mr. W. H. Edwards, as a typical example of the species.

27. *Papilio Indra*.

PLATE IV; Figures 27, b.

Fig. 27, Male, Tallac Peak, Cal., July 26, 1892; Author.

b, Female underside, Tallac Peak, Cal., July 26, 1892; Author.

Indra is strictly an alpine butterfly, at home on sharp, rocky peaks of 10,000 to 12,000 feet in height, and so far as I have observed in California, not coming down the mountain side lower than 9,000 feet. It is peculiar in its habits as well as in its habitat, in that while most *Papilios* are good feeders, Indra spends its time on those high, bare rocks in sunning itself when the sun shines, and in occasionally starting up energetically to flirt with or to fight some other butterfly, but never wasting any time in feeding on flowers to prolong its life.

It is the most difficult of all California butterflies to capture, as it frequents the most inaccessible places, and is moreover exceedingly wary. I have spent much valuable time (for on the top of a peak 10,000 feet high, time is always valuable), in watching it to learn if possible the secret of its food-plant, but always unsuccessfully. Because it does not feed on flowers, and for other reasons, I believe that the life of the individual butterfly is very short, indeed, say from three to eight days, according to the weather, and that its life as a butterfly is wholly spent in play and in the reproduction of its species.

The preliminary stages of egg, larvæ, and chrysalis, are wholly unknown, as also the food-plant.

28. *Papilio Pergamus*. Never before figured in any work.

PLATE IV; Figures 28, b.

Fig 28, Male, San Bernardino Mountains, May 12, 1888;
Author.

b, Female underside, San Bernardino Mountains, May
10, 1888; Author.

Here I have pleasure in showing you the upper and lower sides of *Papilio Pergamus*, a rare butterfly, and one that has never before been illustrated anywhere. The species was published by H. Edwards, in 1874, but the butterfly has always been so rare that but few people have ever seen a specimen of it. His description was written from one male specimen which was taken near Santa Barbara in May, 1873, taken probably by himself; the description moreover was brief and indefinite, possibly because his example might have been worn or defective. For these reasons, chiefly, as I suppose, and also because as years passed and no others were taken, the impression gained credence that after all perhaps *Pergamus* was only *Indra*; at any rate, *Pergamus* has

never been accorded its proper place in the catalogues as a full species. And it is time it should be recognized.

Besides these two examples here figured, I have taken two others, one of them at as late a date as 1902, and the four specimens are alike in all their features. Pergamus is jet black, while Indra is brown-black. Indra does not fly so far south as the San Bernardino mountains by about 500 miles.

Pergamus flies in the lower mountains of Southern California, at an elevation of from 2,000 to 3,000 feet, and frequents steep side-hills and brushy places, seeming to know where they are safe; and at any rate they are very rare, as these four specimens mentioned are all that I have taken in twenty-five years' collecting, although the locality is near by, and is a favorite hunting ground for butterflies.

Eggs, larva, and chrysalis, as well as food-plant, are unknown.

29. *Papilio Asterias*.

PLATE IV; Figures 29, b.

Fig. 29, Male, received from Herman Strecker, October, 1882.

b, Female underside, received from Herman Strecker, October, 1882.

Asterias is well-nigh a national butterfly. It inhabits the Atlantic States and the Middle West States in great abundance, and is common as far west as the Rocky Mountains. West of the continental divide, however, it is much scarcer, and on the immediate West Coast is quite unknown. So far as my experience goes, west of the continental divide *Asterias* is largely replaced by *Asteroides*; this latter species being also absent on the immediate coast, and, in fact, I have never seen either of them west of the Sierra Nevadas.

In Arizona, near Tucson, I have taken *Asterias* of very small size, so small in fact that it might almost be taken for another species.

The egg, larva, and chrysalis are well known.

The food-plant is *Daucus*, various species of the carrot family.

30. *Papilio Asteroides*. Not figured elsewhere in accessible form.

PLATE IV; Figures 30, b.

Fig. 30, Male, Mount Shasta, Cal., August, 1890; Author.
 b, Female underside, Mojave Desert, Cal., June 29,
 1887; Author.

Much has been written about this species, as to whether or not it is distinct from *Asterias*; it has been claimed to be merely a transient and more or less variable form or variation of *Asterias*; obsolescent as to the macular yellow band, or melanic, in that the yellow is more or less obscured by black. In the Coast States west of the Sierra Nevada range of mountains neither *Asterias* nor *Asteroides* is present to any considerable extent, but in the semi-desert regions east of the great mountain range, and west of the Rocky Mountains, *Asterias* is scantily if at all represented, while *Asteroides* is not rare; and it is said to be common in Mexico, and further south to Costa Rica.

In the Mojave Desert, where this second example b was taken, they were rather common, flying about the grove of cottonwood trees; but *Asterias* was not present. *Asterias* is, therefore, the Eastern, and *Asteroides* the Western and Southern, or desert form.

The preliminary stages are doubtless the same as for *Asterias*.

31. *Papilio Philenor*.

PLATE IV; Figures 31, b. c.

Fig. 31, Male, Sonoma County, Cal., May, 1894; Author.
 b, Female, Sonoma County, Cal., May, 1894; Author.
 c, Female underside, Sonoma County, Cal., May,
 1894; Author.

Philenor, also, as well as the two preceding species, is chiefly an Eastern butterfly, and is as yet scarce on the West Coast. In all my travels over the Coast States I have scarcely ever seen this butterfly, two or three times, only: once, in the year above named, along the road between St. Helena and Calistoga, I saw them in abundance, but the occurrence was extremely local.

Philenor larvæ are said to feed on *Aristolochia*, "the Dutchman's pipe," and a vine of this class is found, though rarely, between Monterey and Marin County, and also at Chico, and Redding, and nowhere else has the vine been observed, though it must be present at the locality where these butterflies were found. If, therefore, as is likely, *Philenor* larvæ feed exclusively on *Aristolochia*, the butterflies will necessarily be much restricted in diffusion.



At Mazatlan, on the west coast of Mexico, I have seen and taken plenty of *Philenor*, and in the winter time, at that; and there, too, the *Aristolochia* vine is abundant.

The preliminary stages are already well known.

Genus NEOPHASIA

32. *Neophasia Menapia*.

PLATE V; Figures 32, a, b.

Fig. 32, Male, Sisson, Cal., July 25, 1885; Author.

a, Male, underside, Vancouver Island, July, 1891;
Author.

b, Female, underside, Sisson, Cal., August, 1891;
Author.

Menapia is a very tender and delicate butterfly. It flies in Oregon and Washington in inconceivably large numbers, and extends north into British Columbia in lesser numbers, as well as coming south into the mountains of Northern California, extending along the high peaks of the Sierra Nevadas as far south as the Lake Tahoe region, which is its southernmost point.

The larvæ feed on the leaves of pine and fir, and are in places so numerous that the leaves are stripped from whole forests. The female appears in late July and August, laying its eggs on the younger leaves of old pine trees, high up in the air; the leaves are placed in rows of ten or a dozen eggs on a leaf. When she becomes tired, or the supply of mature eggs is exhausted, she flutters slowly down to the ground, to feed on flowers, looking, as she descends, like a big snow-flake coming down. The eggs do not hatch till the next spring; the larval life is rapid, and when mature they pupate on the bark of the trees; but whether the chrysalides ever disclose the same year or not is not known; probably not, and all the chrysalides probably hibernate on the bark till next summer; if so, the preliminary stages occupy two years, from the laying of the egg to the disclosure of the butterfly.

33. *Neophasia Suffusa*.

PLATE V; Figures 33, b, c.

Fig. 33, Male, Sisson, Cal., July 25, 1885; Author.

b, Female, Sisson, Cal., July 27, 1885; Author.

c, Female underside, Sisson, Cal., July 27, 1885;
Author.

Suffusa is a variety of *Menapia*, characterized by heavier dark markings along the veins, and a tinge of red more or less obvious on the margin of the hind wings. This is merely in degree, as all *Menapia* that I have examined have a slight tinge of red on the margin, and always this red is more obvious on the female. The best specimens of *Suffusa* that I have seen are from the Mount Shasta region of Northern California.

Genus PIERIS

The Pierids are all of them rather small in size, and with slender bodies; wings mostly white, or lined and shaded dusky and yellowish. The Genus covers the whole habitable world; none are very beautiful as butterflies go, but some of the tropical ones are of good size.

The eggs are pear-shaped, yellowish, ribbed; and hatch in quick time, in from seven to ten days. The caterpillars are green, sixteen-legged; and the larval life is from eighteen to twenty-two days' length; the pupa state is about eleven days' length, or may last over winter, so that the butterfly may emerge in spring.

Sex-marks: The pair of claspers at the tip of the body indicate the males the same as in *Papilio*; and the ornamentation of the wings is generally obvious and distinctive.

The food-plants are numerous indeed; the cruciferous plants of all kinds, both wild and cultivated, the clovers, and leguminous or pod-bearing plants of many kinds, and many others.

34. *Pieris Beckeri*.

PLATE V; Figures 34, a, b, c.

Fig. 34, Male, Cabazon, Cal., March, 1889; Author.

a, Male, underside, Southern California, March, 1890;
Author.

b, Female, Pendleton, Oregon, July, 1891; Author.

c, Female, underside, Pendleton, Oregon, July, 1891;
Author.

Pieris Beckeri is found all over the western part of the United States, from the Rocky Mountains to the Pacific Ocean, and from Mexico on the south to far up in British Columbia on the north. It is rather a northern butterfly, however, for it is larger and

finer in the north near the National boundary than it is in the southern warmer and drier regions. The peculiar greenish-black markings on the underside of the hind wings are so peculiar and distinctive that no one can mistake the species after having once seen a specimen or a plate of it.

I have observed *Beckeri* ovipositing on the desert plant *Isomeris arborea*, on the margin of the Colorado Desert in Southeastern California.

35. *Pieris Sisymbri*.

PLATE V; Figures 35, a, b, c.

Fig. 35, Male, Summit, Cal., 7,500 feet altitude, June 26, 1892; Author.

a, Male, underside, Summit, Cal., 7,500 feet altitude, June 26, 1892; Author.

b, Female, Paso Robles, Cal., March 16, 1894; Author.

c, Female, underside, Mt. St. Helena, Cal., April, 1894; Author.

On the West Coast *Sisymbri* flies from San Luis Obispo County on the south to perhaps the northern line of the State of California, and thence east through Nevada to Colorado, and south to northern Arizona. It is rather a mountain butterfly, not being found on the plains in any case, so far as I have observed, but frequenting the hills and the higher mountains, up to at least 8,000 feet altitude. I have found it abundant enough in Central California, but absent both in the north and the south. It has been stated to be plentiful all over the State, but that is a mistake. It is very peculiarly marked, but quite distinctively, when you become acquainted with it. In life, the veins are not black, as has been stated, but amber, or yellowish, and it is only after the lapse of some years that the veins become black.

Egg is long, narrow, conical, both base and top flattened, ribbed, yellow when fresh, and later, just before hatching, red. From egg to chrysalis is from thirty to thirty-three days; the chrysalis is dark-brown; the larvæ moult but three times.

36. *Pieris Flava*. Not elsewhere illustrated in accessible form.

PLATE V; Figures 36, b, bb.

Fig. 36, Female, given me by O. T. Baron, in 1879. No data.

b, Female, Summit, Cal., 1,500 feet altitude, June, 1892; Author.

bb, Female, underside, Tallac Peak, 10,000 feet altitude, July, 1892; Author.

Flava is supposed to be a dimorphic female of *Sisymbri*, no male having yet been found, and always yellowish in color, like these figures. But it would not surprise me to know that there is a male, and that it is a sort of a twin species to *Sisymbri*. It seems to inhabit higher altitudes than *Sisymbri* by 2,500 to 3,000 feet, and to be absent at *Sisymbri*'s lower ranges.

No one has ever bred the larvæ of Flava, nor is the larval food-plant known, though presumably it is any one of the cruciferous plants; the egg, also, has never been described; it must, however, be fertile, judging from analogy, for other dimorphic females are always very prolific, tending to out-breed the normal-colored females.

37. *Pieris Nelsoni*. Not elsewhere illustrated in accessible form.

PLATE V; Figure 37.

Of *Nelsoni* only one male specimen has ever been taken; that one by Mr. Nelson, at St. Michaels, Alaska. The figure here shown is a photographic copy of a pen-drawing by Miss Colgan, of the lithograph figure of Mr. Edwards, published in 1883, in his *Butterflies of North America*, an expensive work, and inaccessible to most people.

The right-hand wings are the upperside, and the left-hand ones are the underside. The pen-drawing is well done, as an error which crept into the drawing made by the lithographer, as the expert lepidopterist will perhaps notice, is faithfully copied.

38. *Pieris Occidentalis*.

PLATE V; Figures 38, b.

Fig. 38, Male, Ellensburg, Eastern Washington, May, 1890; Author.

b, Female, Sierra Nevadas, Cal., 7,000 feet altitude, 1892; Author.

Occidentalis is a very common butterfly all over the whole western part of the United States, west of the Rocky Mountains; being rather a cold species, and loving the more northern parts better than the southern. On the immediate Coast it is not seen much



south of the latitude of Monterey, and being quite absent in the more southern counties, where *Protodice* takes its place. In its range *Occidentalis* flies from the sea-coast, over the plains, and high up into the mountains, being everywhere present.

39. *Pieris Calyce*.

PLATE V; Figures 39, b.

Fig. 39, Male, Tacoma, Washington, May 10, 1890;
Author.

b, Female, Lake Tahoe, Cal., July, 1892; Author.

Calyce is the cold-weather, or early brood of the preceding, being smaller in size and darker in color or markings. Of course there is no sharp dividing line between *Occidentalis* and *Calyce*, but they intergrade insensibly, and many specimens could not be separated, or would be determined differently, by different men.

40. *Pieris Protodice*.

PLATE V; Figures 40, b.

Fig. 40, Male, Slover Mountain, Cal., 1889; Author.

b, Female, Greenhorn Mountains, Cal., June, 1888;
Author.

Protodice is the southern representative of *Occidentalis*, mingling with *Occidentalis* along the latitude of Monterey, but not going so far north, and going far south into Mexico, where *Occidentalis* does not go. It also goes well to the countries east of the Mississippi River, being, in fact, one of the widest-flying species of western America.

41. *Pieris Vernalis*.

PLATE V; Figures 41, b.

Fig. 41, Male, Riche Canyon, So. Cal., December 15, 1891;
Author.

b, Female, Mt. St. Helena, Cal., April 2, 1894;
Author.

This is the cold-weather form of *Protodice*, occurring mainly in the cold seasons of winter and spring; it is smaller in size, and darker in markings than *Protodice*, and is, in fact, more of a seasonal form than anything else; no one supposes that it is separate and distinct.

The underside of these four forms is not shown on the plates, as the pattern of the ornamentation is the same on both sides.

42. *Pieris Bryonæ*.

PLATE VI; Figures 42, a, b, bb, c.

Fig. 42, Male, Juneau, Alaska, July 10, 1891; Author.

a, Male, underside, St. Michaels, E. W. Nelson, ex.
W. H. Edwards.

b, Female, Juneau, July 10, 1891; Author.

bb, Female, Juneau, July 10, 1891; Author.

c, Female, underside, Chillkat, July 20, 1891; Author.

Bryonæ lives in Alaska, coming south but little if any below Sitka. It is essentially a cold-weather butterfly, and loves to fly about in the neighborhood of snow-banks and glaciers, feeding on the blossoms of the few and small Arctic cruciferous plants that grow there. I found them more abundant at Pyramid Lake than at any other locality; they are a low-land kind, and are not found up on the mountains at all.

The wings of *Bryonæ* are almost always deeply yellowed, as well as browned. The veins are always deeply marked or overlaid with brownish-yellow, brown on the upper side, and yellow on the under side.

43. *Pieris Hulda*.

PLATE VI; Figures 43, a, b, bb, c.

Fig. 43, Male, Juneau, Alaska, July, 1891; Author.

a, Male, underside, Chillkat, Alaska, July, 1891;
Author.

b, Female, Juneau, Alaska, July, 1891; Author.

bb, Female, St. Michaels, Alaska, E. W. Nelson, ex.
W. H. Edwards.c, Female, underside, Juneau, Alaska, July, 1891;
Author.

Hulda is similar to the preceding, but a little smaller in size, and more brownish than yellow; *Bryonæ* being the yellow form, and *Hulda* the brown one; and the veins of *Hulda* are not so heavily overlaid with color, or in other words, not so distinctly marked.

In Figure *a*, for instance, the veins are not defined at all, if they were, it would be classed as a *Bryonæ*, I suppose, because it is so yellow. I suppose that these two forms are really but one species, just as *Occidentalis-Calyce*, and *Protodice-Vernalis* are but one; but the two names serve to identify the two differing forms, as is proper, for that is what names are used for.

In this plate I have given a good series of the species figured, to show the various forms, and the distinguishing characters of each; as just one figure of each kind would not give the student a fair idea of the distinguishing features of the different species.

44. *Pieris Ochsenheimeri*.

No figure.

I have never seen a specimen of this butterfly. It is said to inhabit the country along the Pacific Ocean to the north of Puget Sound, on the west coast of British Columbia. I have hunted butterflies along that coast, but did not get anything of this kind. From the description it would seem to be a form of *Rapæ*. The description reads:

"White, costa blackish-gray, apices blackish; a round black spot in space between last costal and first discoidal nervure. Nerves with faint gray scales. Bars of the wing black. Hind wings white, with one spot on outer third of costa. A very narrow sub-marginal line on all wings. Underside, same as above, apices yellowish, and an indefinite spot below the third discoidal nervure. Hind wings have mixed gray and yellow spots as in *Bryonæ*. The female has veins rather more heavily marked with gray, also the apices and the bases."

45. *Pieris Venosa*.

PLATE VI; Figures 45, a, b, c, cc.

Fig. 45, Male, Tenino, Wash., August 9, 1891; Author.

a, Male, underside, Tacoma, Wash., May 3, 1890;
Author.

b, Female, Tacoma, Wash., May 6, 1890; Author.

c, Female, underside, Tacoma, Wash., May 1, 1890;
Author.

cc, Female, underside, Mt. St. Helena, Cal., April,
1894; Author.

All Pierids have a weak, gentle flight, stopping often to feed on the blossoms of flowers, and so are easily taken, and *Venosa* is no exception to the rule. The wings of *Venosa* are all white on the upper side and have but few black scales at apices or elsewhere. Beneath, all veins of the females are positively margined with black scales, whence the specific name, *Venosa*, or veined, and all wings are more or less tinted with yellow, especially the hind ones, on underside.

Venosa has a rather wide range on the sea-coast, from the southern point of Alaska on the north, to Monterey on the south; but it does not extend far inland at any point, nor does it ascend high up on any mountains; yet I have taken occasional specimens of it in Montana, on the eastern side of the continental divide, but it is rare there. The northern examples are darker, usually, than the southern.

46. *Pieris Pallida*.

PLATE VI; Figures 46, a, b, bb, c.

Fig. 46, Male, Tenino, Wash., May 1, 1890; Author.

a, Male, underside, Tacoma, Wash., May 3, 1890;
Author.

b, Female, Tenino, Wash., August 9, 1891; Author.

bb, Female, Truckee, Cal., July, 1892; Author.

c, Female, underside, Tenino, Wash., August 9, 1891;
Author.

Pallida is distinguished by the dark line along the inner edge of the fore wing; this is but slight in the male, but is prominent in the female, and near the outer angle of the fore wing this dark mark turns upward into a dusky patch, above which is another patch or spot. This dark line along the edge of the wing is peculiar to this butterfly, and is seen in no other kind. The upperside of *Pallida* is daintily tinted with faint brownish-yellow, and the underside with clear yellow; these tints may have seemed "pallid" to Dr. Scudder when he named it, I know of no other reason for the pallid name.

Pallida has generally the same range as *Venosa*, restricted a little at both the northern and the southern limits, so that it ranges from Central California to Canada, west of the Sierra Nevada Mountains, and running up into the high mountains to an altitude of 7,000 feet.

47. *Pieris Castoria*. Not elsewhere illustrated in accessible form.

PLATE VI; Figures 47, a, b, c.

Fig. 47, Male, taken at Oakland, Cal., June, 1894; Author.

a, Male, underside, Oakland, Cal., April 25, 1894;
Author.

b, Female, San Juan, Cal., April 16, 1894; Author.

c, Female, underside, Mt. St. Helena, April, 20, 1894;
Author.

The key, or dominating characteristic of *Castoria* is the round dark patch in the fore wing of both male and female, as shown on the plate. The wings of both sexes are white upon the upperside, except the small apical and marginal markings as shown, and on the underside the veins of both sexes are margined with brown, and slightly tinted with yellow, the wings of the female being somewhat darker or more strongly tinted than those of the male. *Castoria*, and half a dozen others are by some considered as varieties of *Napi*, a European butterfly, and it may be possible to consider all butterflies as related in some degree one with another. *Castoria*, as delineated on the plate, is *Castoria*, and as such I figure it, regardless of what its ancestry may have been, or of what its present relations may be with other species.

Castoria has about the same range as *Pallida*, but not inhabiting the mountains to any extent; I have found it more common about the Bay of San Francisco than anywhere else.

48. *Pieris Rapæ*.

PLATE VI; Figures 48, b, bb, c, cc.

Fig. 48, Male, San Bernardino, Cal., 1895; Author.

a, Male, underside, San Bernardino, Cal., 1895;
Author.

b, Female, San Bernardino, Cal., May, 1883; Author.

bb, Female, San Bernardino, Cal., 1902; Author.

c, Female, underside, San Bernardino, Cal., 1896;
Author.

cc, Female, underside, San Bernardino, Cal., 1896;
Author.

Rapæ is a European species, where it is known as "the cabbage butterfly," and was introduced into the Eastern States in 1863; thence it traveled westward and was taken in Nebraska about 1881, and the first one to be taken in California is the second figure, *b*, on this plate, in May, 1883. Fig. *bb* is the normal female at recent date; fig. *c* is a peculiarly shaded specimen, the cell of hind wing being dark; *cc* is the normal female.

At the present time *Rapæ* flies probably over the whole of the West Coast, and will, evidently become a great pest, from its habits of laying its eggs on cabbage plants. It is worthy of note that this European species is the only one of the *Pieris* family to feed on cultivated plants; all our native species prefer the wild

plants, and do not lay their eggs on any cultivated plants, unless compelled to do so. I have raised *Rapæ* larvæ to imago from eggs laid on common garden Nasturtium, the larvæ being fed solely on the leaves of that plant.

49. *Pieris Nov-Angliæ.*

No figure.

This is a minor variation of *Rapæ*, named for New England, where it was first noted, and it is set down in the lists as occurring all over the United States wherever *Rapæ* may fly. But there is no account of this form ever having been seen on the West Coast. The peculiarity of this form is that the wings are all yellowed on both sides, whereas the typical *Rapæ* is yellow only on the under side of hind wings, and apices of fore wings.

Manni. This name stands for a pale yellow form of *Rapæ*, and presumably there is but little difference between this and the preceding, but, as stated, these yellow forms have not yet been seen on the West Coast.

50. *Pieris Immaculata.*

No figure.

This is another variation of *Rapæ*, not yet seen on the Pacific Coast; the name indicates that it is not spotted with black. These names are mentioned as it is possible that such forms may at any time be found here.

51. *Pieris Marginalis.*

PLATE VI; Figure 51, Male, Klamath River, Cal., 1891;
Author.

At about the same time that *Rapæ* was introduced into the Atlantic States from Europe, or, perhaps, a few years earlier, a similar species was found on one of the islands of Puget Sound, and also near Crescent City in northwestern California; these western *Rapæ* were given the names *Marginalis*, *Yreka*, *Resedæ*, by different authors, but these names are now generally ignored. I will, however, illustrate one example, and that one will be sufficient to cover all of the names, I believe.

Genus NATHALIS.

52. *Nathalis Iole.*

PLATE VII; Figures 52, b.

Male and female, So. California, 1890; Author.



One genus alone constitutes this little class, and the species *Iole* fills the genus. It stands alone, widely different from any other butterfly. The figure illustrates it so well and completely that any description would be superfluous. *Iole* is more common in the southern part of the West Coast than in the northern. It inhabits all the western part of the United States west of the Mississippi River.

There are two broods of *Iole*, one in May and the other in July. The latter brood are found only along the streams and in damp places, and they are very fond of feeding on water at damp places by the roadside.

The larval food-plant is *Erodium cicutarium*, "alfilaria," "filaree," or "Spanish needles."

Genus EUCHLOE.

In some technical points this genus is near genus *Pieris*, but the butterflies differ widely from all *Pierids* in the marbling of the wings on underside, which is so distinctive that it cannot be mistaken. The five members of *Euchloe* were formerly included in Genus *Anthocharis*; but on account of the absence of orange apices, and of the different pattern of marbling of underside of hind wing, it is proper to class these five under the genus name of *Euchloe*.

All the members of this genus are white-winged, with but slight dark ornamentation, and all of them are slender-bodied and rather delicate-looking butterflies, but nevertheless they are good flyers, and hardy in all weathers.

Sex-marks are the same as in preceding genera, namely, the anal-claspers of the male; the female has no claspers, but the tip of the abdomen is clad with grayish bristles or hairs. When dry and shrunken it is sometimes difficult to discern the sex-marks, and the student should without fail determine this point while the specimens are fresh. A gentle nipping of the abdomen with the tweezers while the specimen is fresh will be decisive.

The food-plants of all the members of *Euchloe* are the Crucifers, of which there are thirty genera in California; the most favored of which are *Arabis*, *Streptanthus*, *Sisymbrium*; *Brassica*.

53. *Euchloe Lanceolata*.

PLATE VII; Figures 53, b, bb, c.

Fig. 53, Male, City Creek, Cal., March 22, 1889; Author.

b, Female, City Creek, Cal., March 12, 1891; Author.

bb, Female, Emigrant Gap, June 23, 1892; Author.

c, Female, underside, Emigrant Gap, June 25, 1892;
Author.

Lanceolata is a well-known species; a true mountain-flyer, it is never seen on the plains, or near the sea, but it is found on the highest mountains, and likes to fly about the snow-banks of the higher peaks when the whole country in that vicinity is cold and wet and sodden with the melted snow-water. In the south, where there is no snow, it is apparently hunting for it all the time. It appears early in the spring among the first butterflies of the season.

I have figured a good series, to show the variation; 53 and b, are the normal male and female of the south; bb, the normal female of the higher mountains of northern California; and c, is the underside of the northern female. You will notice that the northern specimens are lighter in apical coloring than the southern; the underside agrees with the upper in this, and it is anomalous, for the contrary is the rule, that northern specimens are darker than southern ones.

Lanceolata has a range from St. Michaels, Alaska, to the Mexican line, and doubtless it flies several hundred miles further south, in the mountains of Lower California.

The food-plants are the crucifers; *arabis perfoliata* being the favored plant in California, according to my repeated observations.

54. *Euchloe Creusa*.

PLATE VII; Figures 54, a, b.

Fig. 54, Male, Slover Mountain, So. Cal., March 19, 1896;
Author.a, Male, underside, Tucson, Ariz., June 20, 1887;
Author.b, Female, Ellensburg, Eastern Wash., May, 1891;
Author.

This, and the three following species always show the round white spot near the apices. In *Creusa* the bar at end of cell is broad, cut by a white line, and does not reach the costa, being bent

inwards; on the underside the marbling is dark emerald-green, and is broken into large blocks leaving rather large, clear, pearl-white spaces with clean-cut edges. *Creusa* flies from the Mexican line to Canada, but not on the immediate Coast at any place, but east of the Cascades, in the dryer and warmer air of that semi-desert region in Eastern Washington and Oregon, and in the warm and dry interior valleys of south. At Ellensburg I have found them, small in size but abundant in numbers, in May. Throughout its whole range it comes not to the sea-shore, but keeps a range of mountains between it and the sea, as it likes not the damp sea air.

55. *Euchloe Hyantis*.

PLATE VII; Figures 55, b, c.

Fig. 55, Male, Berkeley, Cal., March 14, 1894; Author.

b, Female, Bakersfield, March 10, 1891; Author.

c, Female, "West Washington," no date, W. H. Edwards.

Compared with *Creusa*, *Hyantis* is larger, the dark markings at apices are heavier; generally the round white spot is diffused; the bar at cell is less broad, reaches the costa by a small point, is not bent inwards, and is not cut by a white line. And below, the marbling is finer in grain, smoother, with fewer white spaces, and with the edges not so clear-cut; the marbling is more yellow-green, looking as if the yellow were washed on after the green was in place.

Hyantis is the cool-weather species, and *Creusa* is the warm-weather brother; *Hyantis* favors the damp, coast air, and *Creusa* likes a dry, warm climate, and neither intrudes very far upon the territory of the other, so far as my experience goes to show the facts.

56. *Euchloe Rosa*.

PLATE VII; Figure 56, c.

Female, Napa, Cal., 1878; unknown collector.

The type of *Rosa* was found in Western Texas, and *Rosa* is not known to occur elsewhere, until now this specimen from California comes up. The yellowest *Rosa* yet known, as the typical *Rosa* has but the merest touch of yellow on underside marbling of hind wing. This *Rosa* was said to have been taken incidentally by an

amateur collector, whose name I could not learn, and presumably at or near Napa.

The two preceding figures, 56, b, are some variety of *Ausonides*, occurring outside of the territory covered by this book, and are erroneously placed before the figure of *Rosa*, c.

57. *Euchloe Ausonides*.

PLATE VII; Figures 56, b, 57, b, c.

Fig. 56, Male, Central Montana, June 25, 1890; Author.

b, Female, Tucson, Arizona, June, 1887; Author.

57, Female, Central Montana, June 23, 1890; Author.

b, Female, Central Montana, June, 1890; Author.

c, Female, underside, Vallejo, Cal., June 2, 1892; Author.

By error the yellow *Rosa* was placed in the middle of this line when it should have been placed first, and *Ausonides* following.

Ausonides inhabits the whole country west of the Rocky Mountains, though it is not abundant in any one locality that I have ever found, and it is only occasionally that a specimen can be found. The Western examples are larger than the Eastern. I regard the figures 57, b, c, as typical, and the preceding, 56, b, as varying somewhat, from the regular form. The last one in the line, c, is unusually large and very yellow.

Genus *ANTHOCHARIS*.

This genus comprises the "orange-tips" only. The orange-tips are very readily distinguished by the orange patch at the apices of the fore wing. The members of this genus are all of small size; mostly white, with dark ornamentation on upper side, and dark or greenish or yellowish marbling on the under side of hind wings.

This group of butterflies finds its metropolis in California, where some six species and several sub-species or varieties are found, against one species on the Atlantic Coast, and two or three in Europe.

The eggs of all the species are laid singly on the young leaves of cruciferous plants, and they hatch in nine days if they hatch at all, the first year. The larvæ are very irregular in their habits, according to the season; but the pupæ are the most irregular and

unaccountable in their behavior, for they sometimes go over to the second or the third year before emerging. What the laws are that govern the pupæ in these matters, no one knows.

Sex-marks are the same as in *Papilio*, the claspers, and the shape and size of the body; though most species show the sexes by the different ornamentation of the apices of the fore wings; this pattern in the female, consists in a series of small, white, diamond-shaped or wedge-shaped spots between the orange and the dark cloud which lines the orange on the outside, near the apices. In some of the species, however, this series of white points is nearly or quite absent, or so clouded over as to be indistinguishable, e. g., *Pima*.

58. *Anthocharis Cethura*.

PLATE VII; Figures 58, a, aa, b, bb, c.

Fig. 58, Male, East Riverside, Cal., March 22, 1895;
Author.

a, Male, Slover Mountain, April 10, 1896; Author.

aa, Male, underside, Little Mountain, April 15, 1896;
Author.

b, Female, Cabazon, Cal., April 6, 1899; Author.

bb, Female, Riche Canyon, March 12, 1895; Author.

c, Female underside, Mentone, April 28, 1895;
Author.

The members of the first group, *Cethura*, *Morrisoni*, and *Deserti*, as shown on this plate together, are found only in Southern California. I give a series of six examples of each of these forms, to show conclusively the variations, having, I suppose, an unequaled collection of them to select from. These are all good, typical specimens, and not the extremes in any direction. The butterflies are so well shown on the plate that there is little necessity for lengthy explanation; about fifteen per cent are yellowed more or less, males and females alike. The marbling on underside of hind wings is always bright yellow-green, and not dense.

59. *Anthocharis Morrisoni*.

PLATE VII; Figures 59, a, aa, b, bb, c.

Fig. 59, Male, Ferndale, Cal., March 20, 1895; Author.

a, Male, San Joaquin Valley, March 24, 1891;
Author.

aa, Male, underside, San Joaquin Valley, March 24, 1891; Author.

b, Female, Ferndale, Cal., March 20, 1895; Author.

bb, Female, Ferndale, Cal., March 8, 1895; Author.

c, Little Mountain, March 1, 1895; Author.

This form I have traveled hundreds of miles on purpose to get the specimens from the typical locality, and I have spared no trouble or expense to get what I went after. Pursuing this one thing for a dozen years, I have succeeded in getting the best there is.

Morrisoni is very like *Cethura* at first sight, but the six figures given herewith will show the regular variation from *Cethura*, which, as the eye becomes acquainted with the peculiarities, are at once and certainly recognized; the cell-bar in Morrisoni is narrower; the apical markings are lanceolate or linear, not confluent, not reaching into the orange; the marbling of underside is less yellow, and more dense.

60. *Anthocharis Deserti*, n. v. Not elsewhere illustrated.

PLATE VII; Figures 60, a, aa, b, bb, c, 60a.

Fig. 60, Male, Garnet Knob, Desert, March 2, 1895; Author.

a, Male, Garnet Knob, Desert, March 1, 1895; Author.

aa, Male, underside, Caliente, March 1, 1895; Author.

b, Female, Caliente, Feb. 25, 1887; Author.

bb, Female, Garnet Knob, March 2, 1895; Author.

c, Female, underside, Indian Wells, March 3, 1895; Author.

60a, Ex. Dr. Behr, San Francisco, 1878?

This new variety is well illustrated by the seven figures above listed. It is a desert form, smaller in size, and paler in ornamentation than the foregoing forms of *Cethura* and Morrisoni, the orange on the apices of the male is less deep, and on the female is nearly or in some instances entirely absent and always pale yellow when present; the marbling of underside is scanty and dusky. I have not seen any specimen of *Deserti* that is yellowed on the upperside, except occasionally a little in rays from the base on hind wings. The figure 60a was given me by Dr. Behr, the cu-





rator at the Academy of Sciences in San Francisco many years ago, date not noted, and he had no data for it, as he rarely noted down data at that time. I had at that early date noted that there was a desert species unrecognized, being in those days often on the desert, and so I got this from him, to follow it up.

61. Anthocharis Genutia.

PLATE VII; Figures 61, male; b, female.

This is the *Anthocharis* of the Eastern States, the only form that is found on that coast. It is inserted here just for comparison, and to show the difference between the eastern and western species. The females of the eastern kind never have any orange on the tips; one might almost class them as belonging to the genus *Euchloe*, and the males *Anthocharis*. In *Euchloe* neither sex has orange on the tips of the wings, and in *Anthocharis* both sexes have orange tips, so that this eastern species appears to belong to both genera.

62. Anthocharis Reakirti.

PLATE VIII; Figures 62, a, aa, b, bb, c.

Fig. 62, Male, Caliente, Kern County, March 29, 1892;
Author.

a, Male, San Bernardino, no date; Author.

aa, Male, underside, S. B. foothills, April, 1887;
Author.

b, Female, S. B. Mountains, April 14, 1896; Author.

bb, Female, Banner, San Diego Co., April, 1893; F.
Stephens.

c, Female, underside, Arrowhead Canyon, March 6,
1892; Author.

This is about the first butterfly to appear in spring on the west coast; *Cethura*, *Morrisoni*, and *Deserti* are on the wing at about the same time, but *Sara* does not appear till a full month afterwards. *Reakirti* lives on the plains and in the hills of the interior, or not on the immediate sea coast, and flies sometimes up the mountain sides to an altitude of 4,000 feet. It is found from Mexico to Oregon. The males are occasionally yellowed a little, chiefly on the hind wings, and more of the females are yellowed, say to fifteen or twenty per cent, and some are deeply yellowed. Some yellowed ones of both sexes are figured on the plate. All

the species of *Anthocharis* are great feeders on flowers, but are not often seen taking water from the damp ground.

63. ***Anthocharis Thoosa*.** Not illustrated elsewhere.

PLATE VIII; Figures 63, a, aa, b, bb, c.

Fig. 63, Male, Desert of Southeastern Cal., March, 1889;
Author.

a, Male, Desert of Southeastern Cal., March, 1889;
Author.

aa, Male, underside, Indio, Southeastern Cal., March,
1893; Author.

b, Female, both sides, Copy of Type, Ex. Dr. Scudder.

bb, Female, Seven Palms, Desert, Feb. 28, 1893;
Author.

c, Female, underside, Palm Springs, Colo. Desert,
1884; Author.

Smaller than *Reakirti*, but of the same group; the orange patch is decidedly paler; the white of upperside is rather sordid; on the underside the marbling is greenish-bronze, fine-grained and denser, of a negative aspect, not contrasting sharply, as in *Reakirti*.

This variety is the desert form of *Reakirti*, as *Deserti* in the foregoing group is the desert form of *Cethura*. This is the first illustration of *Thoosa*, although it has been known for twenty-seven years. Fifteen years ago, in discussing the *Anthocharis* with Mr. W. H. Edwards, who, it cannot be denied, understood butterflies better than any other man in America, he wrote me this: "*Thoosa* has no affinity with *Cethura*. I saw the specimens at the time, and I regard it as a good species. Dr. Scudder has the type." (I will explain that originally there were two or three specimens of *Thoosa*, that Dr. Scudder kept his type, which is now in the Harvard Museum, and that the others, one or two, have disappeared, and are probably lost.) Therefore, in 1892, having then the preparation of this book in hand, I wrote to Dr. Scudder asking that *Thoosa* might be copied for me, in any way that might please him, at my expense; and he caused Mr. Blake, the entomological artist, to copy it for me; and after examining the copy "point by point," Dr. Scudder certified that it was "O. K." This pen-copy is photographed in this plate as the fourth in the line, lettered b. The left-hand wings are the upperside, and the right-hand ones are the underside. I am thus careful in giving the pedigree of *Thoosa*, as a great deal of misapprehension is

abroad regarding it. Thoosa type was taken in the canyon of the Virgin River, in southwestern Utah. My examples of Thoosa were taken in the adjoining region of southeastern California.

64. *Anthocharis Julia*.

PLATE VIII; Figures 64, a, aa, b, bb, c.

Fig. 64, Male, Central Montana, June 30, 1892; Author.

a, Male, Sierra Nevadas, 7,500 feet altitude, June, 1891; Author.

aa, Male, underside, Colorado Mountains, 1889; D. Bruce.

b, Female, Western Colorado Mountains, 1889; D. Bruce.

bb, Female, Shasta Mountains, no date; Author.

c, Female, underside, Rocky Mountains, 10,000 feet altitude; D. Bruce.

Size of Thoosa; much the same aspect, the black markings are a little less heavy; and the marblings on underside are "foliated," but the two forms are similar; especially when we consider that Thoosa is a warm desert form and that Julia is a high mountain species, and might well be expected to be very different in appearance. Julia is chiefly a Colorado butterfly, but is occasionally seen on the high mountains of Central California, at an altitude of not less than 7,000 feet. It seems to be an alpine species throughout its range, in Colorado as well as in the Sierra Nevadas. It is usually seen flying on the mountain sides and peaks in places that are partially clad with pine and other trees; being in this respect somewhat remarkable, as only three or four other butterflies have similar habits.

65. *Anthocharis Flora*.

PLATE VIII; Figures 65, a, aa, b, bb, c.

Fig. 65, Male type, Tenino, Wash., May, 1890; Author.

a, Male, Mountains of Southern California, 5,000 feet altitude, Feb., 1888.

aa, Male, underside, Portland, Ore., May 2, 1890; Author.

b, Female type, Tenino, Wash., May, 1890; Author.

bb, Female, San Geronio Pass, Cal., March, 1895; Author.

c, Female, underside, Portland, Ore., May, 1890; Author.

Flora is a mountain and northern form or variety of *Reakirti*, and is characterized by a large size; deeper black and more of it on both upper and under sides; by stronger colors of red and green on both sides; by black clusters of scales at the ends of the nervures of hind wing on upper side; and by a zig-zag arrangement or grouping of the blocks of marbling at the ends of the nervures beneath.

Flora is occasionally seen in the mountains of Southern California at an elevation of 5,000 feet, but never in the southern valleys; while in Oregon and Washington it almost or wholly replaces *Reakirti*, flying there at sea-level, and in great abundance, and the specimens are larger and finer than those found in the south. It is not now known how far north Flora flies; I did not see it at Wrangel at either time that I was there, but I believe that it does fly there; and probably in the interior, behind the mountains, it goes much further north.

The male of Flora is not yellowed at all, while the female is always strongly yellow, the lightest one I have ever seen is the figure bb, of the plate; I give it to show the extreme, not as a typical form.

66. *Anthocharis Sara*.

PLATE VIII; Figures 66, a, b, c.

Fig. 66, Male, San Pablo Bay, Cal., June 2, 1892; Author.

a, Male, underside, S. Cal.; Oct. 22, 1887; Author.

b, Female, Pacific Beach, S. D. Co., May 1, 1892;
Author.

c, Female, underside, Berkeley, Cal., April 25, 1894;
Author.

Sara is the largest of the California *Anthocharis*. It flies most plentifully on the immediate coast, and but less commonly in the interior, at any point, disappearing entirely at no great distance from the sea. Its habitat overlaps that of *Reakirti*, both species being found at some common grounds some miles inland; but in those localities common to both, *Sara* does not appear in the spring till a month later than *Reakirti*. Of all the species, *Sara* is unique in that it sometimes is seen in the autumn, in October; no other form of *Anthocharis* is ever seen in the fall.

Because the metropolis of each form is quite out of the range of the other, I think they are separate species. If they were

seasonal forms of the same parents they would both be most abundant in the same localities common to both, which is far from the truth; the reverse is true, that neither form is abundant where the other one is found at all.

67. *Anthocharis Mollis*, n. v. Not elsewhere illustrated.

PLATE VIII; Figures 67, b.

Fig. 67, Male, Riche Canyon, S. Cal., Oct. 27, 1887; Author.
b, Female, San Diego County, Cal., April, 1881;
Author.

This new form or variety of Sara is shown in typical style on the plate. The apical black is sordid and indefinite, being reduced by orange or yellow scales, and the orange is pale in color, and lacks the sub-marginal black which in all other females of the group separates the orange patch from the light sexual series of spots near the margin, the series of sexual spots is yellow, while the wings are white, and all the colors run into each other without the ordinary definite separation. I therefore call it *Mollis*.

I have taken *Mollis* several times each year, in Southern California only, in the spring and in autumn also. It is simply a variation of Sara, though I know not its limits, whether they be seasonal, or climatic, or of habitat.

68. *Anthocharis Stella*.

PLATE VIII; Figures 68, a, aa, b, bb, c.

Fig. 68, Male, Ellensburg, E. Wash., May 8, 1891; Author.

a, Male, Rocky Mountains of Colorado, 1890; D. Bruce.

aa, Male, underside, Webber Lake, Cal., July, 1892;
Author.

b, Female, Summit, Sierra Nevada, 7,500 feet, 1892;
Author.

bb, Female, Western Colorado, 1890; D. Bruce.

c, Female, underside, Spokane, Wash., May, 1890;
Author.

This species has a pretty wide range, from Central California, on the mountains at 7,000 feet elevation, north to British Columbia, and how much further north it goes no man can tell. In the southern parts of its range it is, as stated, alpine in its habitat, but further north, as at the national boundary, it flies in the valleys as

well. *Stella* is a mountain butterfly, and is never seen on lowlands near the coast, nor on any mountains near the salt water, but always east of the high range of the Sierra Nevadas and the Cascades; at Spokane, Wash., I have found them abundant, fine, large ones, more so than at any other place in all my travels.

The males are spoken of as always white, yet the hind wings are sometimes yellowed a little, and the females are always and everywhere yellow. *Stella* is like *Flora* in that the females are always yellow. The pattern of the marbling is different from that of *Sara*, as you see by the plate.

69. *Anthocharis Pima*.

PLATE VIII; Figures 69, a, b.

Fig. 69, Male, Phoenix, Arizona, April, 1897; Dr. R. E. Kunze.

a, Male, underside, Tucson, Arizona, April, 1887; Author.

b, Female, Phoenix, Arizona, April, 1897; R. E. Kunze.

Pima is from Southern Arizona, flying all over that vast desert territory. It is almost always found on the hilltops, flitting about the places where its food-plant is to be found, but it never flies more than a little distance down the hillsides, and is never found on the plains at the base of the hills; in this peculiarity it simulates the habits of some other butterflies, though the males of many species are given to this method of diversion, to play with, or to fight with, the males of the same or other species.

As shown on the plate, both sexes are deeply yellow. The sexes are very much alike, and after the specimens are dry and shrunken and hard it is difficult to always tell which are males or which females. That matter should be attended to while the specimens are soft and fresh.

70. *Anthocharis Caliente*, n. s. Here first illustrated.

PLATE VIII; Figure 70. Female, Colorado Desert, March, 1889; Author.

Caliente, here figured, is unique, having no mate, although it has stood in my cabinet for many years, all the while recognized as a new species. I took it in the Colorado Desert of California, far to the west of Yuma, in a locality difficult of access; and in those days when *Pima* was young I thought possibly it might be



a dimorphic female of Pima, to which group it evidently belongs. But I now conclude that it is a new species, and publish it as such, under the name Caliente, because of the torrid desert which is its home.

In the shape of the wings Caliente differs from Pima; all the wings are moderately yellow; and the marbling of the under side is more bronzy and of different pattern, but I do not see fit to break off the wings of one side in order to show the underside, as in this case it is of but secondary importance, as the pattern of ornamentation of upperside is sufficiently distinctive.

Like all other desert *Anthocharis*, Caliente is of extremely rapid flight, and it was only after a desperate chase that I at length succeeded in capturing it.

Genus CALLIDRYAS.

All the species of this genus are of moderate size, and all of them are yellow, greenish-yellow, or orange-colored, and are without prominent markings. Only one species is found on the West Coast.

Sex-marks: The claspers, as in *Papilio*.

The larvæ are citron-yellow, with black dots, and a blue line on each segment.

Food-plant: Cassia.

71. *Callidryas Eubule*.

PLATE IX; Figures 71, Male; b, Male, underside.

This butterfly inhabits in vast numbers the Eastern States to the Mississippi River, extending south to tropical countries, but on the West Coast it is but scantily represented, being seen only in a few places in the southern part of the State of California; in fact, I have seen more of them flying in the streets of Los Angeles than everywhere else altogether. I suppose that there is some cassia plant cultivated in the gardens there that affords them a larval food-plant, as cassia alone is used by *Callidryas* caterpillars. The wild plants of cassia are not represented at all in California, except in one place in the Mojave Desert, and consequently there is no wild plant for them to feed upon, and they are barred from the State, except for the possible cultivated garden plant.

Figure *c* is under side of male *C. Senna*, taken by me at Mazatlan on the west coast of Mexico, in the winter; it is not known in this part of the country, but is liable to be found at Yuma and along the Colorado River, if there is any plant there for it to feed upon.

Genus MEGANOSTOMA.

This small genus is by many writers considered as a part of genus *Colias*, the technical points as to some of the preliminary stages being similar, but the shape of the wings, and the ornamentation of them is very different from any true *Colias*. The *Meganostomas* are rather of a tropical habit, while many of the *Coliads* are quite arctic.

Usually the members of a genus will all have for a larval food-plant the same kinds of plants, but in this respect the *Meganostomas* are anomalous, for they do not use the same plants, and apparently would die if forced to eat each the other's plant, the plants being wide apart botanically.

72. *Meganostoma Eurydice*.

PLATE IX; Figures 72, a, b, c.

Fig. 72, Male, San Bernardino Mountains, April 26, 1891;
Author.

a, Male, underside, San Bernardino Mountains, April
24, 1887; Author.

b, Female, San Bernardino Plains, March 11, 1896;
Author.

c, Female, underside, Mt. St. Helena, Cal., April 20,
1894; Author.

The male of this species is called the most beautiful butterfly on the West Coast, and its pet name is "The Flying Pansy," from its bright violet, yellow and black colors. It flies from Mexico to a hundred miles north of San Francisco, a distance of about six hundred miles, and it flies on the plains and up the mountain sides to some 3,000 feet altitude. The males have upon the fore wings a most lovely iridescent violet changeable luster, playing upon both the black and the yellow, but it will fade. Both sexes fly swiftly and widely, and cannot be taken on the wing except accidentally, but both are good feeders on flowers, and are fond

of taking water at damp places on the ground, where they are gregarious, and are easily taken.

The larval food-plant is *Amorpha Californica*, an anomalous plant having a one-petaled blossom. The plant is limited in range, and the butterfly is thereby also limited in range.

73. **Meganostoma Bernardino.** Not elsewhere illustrated in accessible form.

PLATE IX; Figures 73, a, b, c.

Fig. 73, Male, San Bernardino Mts., April, 1888; Author.

a, Male, underside, San Bernardino Mts., June 10, 1889; Author.

b, Female, Highlands, Cal., March 16, 1896; Author.

c, Female, underside, City Creek Canyon, S. B. Mts., Feb. 26, 1888; Author.

Bernardino is a variety of *Eurydice*; was separated by W. H. Edwards in 1887, from material sent him by me; and the variety was based upon the following points: Smaller size, absence in part of the violet reflection on fore wings, black border on hind wings, as to males; and in the female, the smaller size, and the series of small points near the margin of all wings, on both upper and under sides.

This last point, as I have shown, does not always hold good. Mr. Edwards thought that Bernardino was an early appearing form; that, in fact, it was the early brood of *Eurydice*; but I think it is rather the altitude than the season that counts in this matter, for Figure a was taken in June; and I have never taken a Bernardino down on the low plains at any season.

Preliminary stages as in *Eurydice*.

74. **Meganostoma Amorphæ.** Not elsewhere illustrated in accessible form.

PLATE IX; Figures 74, b, bb.

Fig. 74, Female, City Creek, S. B. Mts., March 10, 1892; Author.

b, Female, Arrowhead Canyon, S. B. Mts., April 29, 1896; Author.

bb, Female, Mormon Pass, S. B. Mts., June 22, 1897; Author.

Amorphæ is a dimorphic female of *Eurydice*. There is no male of this form; but it is simply one of those freaks, more or less

persistent, which are found among the female butterflies of many groups.

At one time I was of the opinion that *Amorphæ* was a hybrid between *Eurydice* and *Cæsonia*. My opinion was based on the facts that *Amorphæ* is only found at the south, where both *Eurydice* and *Cæsonia* meet, and not at the north, where *Eurydice* lives, but where *Cæsonia* does not go; that in early days *Amorphæ* was said to have a male as well as a female; and that, as a wooer, *Eurydice* is exceptionally energetic and persistent, not hesitating to ignore all rules of propriety, of species, and of genera. But of late years, as no male *Amorphæ* is known, I have concluded that *Amorphæ* is simply a dimorphic female. But this possibility of a hybrid form will be a delightful study for some future student.

I give a good series of three individuals; and you will notice that the early seasonal form is the deepest, and the latest or summer form is the palest of the series.

75. *Meganostoma Cæsonia*.

PLATE IX; Figures 75, a, b.

Fig. 75, Male, Palm Springs, Cal., April 20, 1885; Author.

a, Male, Palm Springs, Cal., July, 1887; Author.

b, Female, Colorado Desert, July, 1887; Author.

Cæsonia is only found on the West Coast in the southeastern part of California. It is common in some parts of the Southern Gulf States, but has never yet got much of a foothold on the Pacific Coast.

The preliminary stages are well known.

The larval food-plant is trifolium, the clovers, and allied plants.

Genus *COLIAS*.

A large genus, inhabiting the temperate and arctic zones; medium to small in size; colors almost always yellow, with strong black border, to fore wings always, and to hind wings in part only. The antennæ are short, straight, and increase insensibly to terminate in an obtuse cone, and are somewhat rosy.

The sex is always unmistakably indicated in the pattern of the ornamentation of the wings.

The egg is fusiform, whitish when fresh, crimson later, and black just before hatching.





The food-plant of the entire genus is trifolium of various species, and also in part, legumes. Possibly, also, other plants at present unknown as such. In a general way, alfalfa is now the usual food-plant; and it is also the chief blossom upon which the common species Eurytheme and Keewaydin butterflies feed.

76. Colias Eurytheme.

PLATE X; Figures 76, a, b, bb, c.

Fig. 76, Male, Tehachapi Mountains, Aug. 10, 1876;
Author.

a, Male, underside, Highlands, Cal., Oct. 4, 1897;
Author.

b, Female, Greenhorn Mountains, Cal., June, 1888;
Author.

bb, Female, white, dimorphic, S. Cal., July, 1889;
Author.

c, Female, white, dimorphic, underside, S. Cal., July,
1900; Author.

Eurytheme is considered the type of the orange Colias of the West Coast, as it was noticed and named twenty-six years before the so-called seasonal varieties Ariadne and Keewaydin were found. This, however, is an error that has crept in, for Keewaydin is the stem of the species, and Ariadne and Eurytheme are the varieties. Keewaydin can be taken in any month of the year, in some place or other, but Eurytheme and Ariadne are limited in season.

The dimorphic female, Fig. bb, has never been named; it is merely called Alb. or Alba. It is now quite common, though twenty-five years ago it was a great rarity, and it was accounted a feat to secure one of them, and if the present rate of increase of the blonde form shall go on, in a few hundred years the normal orange-colored female will be extinct and unknown. At present half-whites are abundant; they vary from those having a mere whitening dust on the apices to the full-colored white specimen shown as Figures bb, c.

77. Colias Ariadne.

PLATE X; Figures 77, a, aa, b, c, d, e.

Fig. 77, Male, plains near San Bernardino, Jan. 14, 1900;
Author.

- a, Male, plains near San Bernardino, Jan. 14, 1900; Author.
- aa, Male, underside, plains near San Bernardino, Jan. 15, 1900; Author.
- b, Female, plains near San Bernardino, Jan. 18, 1900; Author.
- c, Female, underside, plains near San Bernardino, Jan. 18, 1900; Author.
- d, Female, white, dimorphic, plains near San Bernardino, Jan. 23, 1900; Author.
- e, Female, underside, plains near San Bernardino, Jan. 5, 1898; Author.

I have given a full series of Ariadne, so complete that but little remains to be written; the figures explain themselves. Ariadne is the winter form, small in size, and pale in the orange flushing on the disk of the fore wings; occasionally there is no orange to be seen.

The white female, as in Eurytheme and Keewaydin, is present in constantly increasing numbers; it has not been named, although all distinct forms are supposed to be named.

The larval food-plant that is preferred by Ariadne is a wild lupine, *Lupinus Minima*. Ariadne is not often seen flying about the alfalfa fields; it seems to be in a wild or uncivilized state, as yet, and chooses the wild plant.

78 *Colias Keewaydin*.

PLATE X; Figures 78, a, b, c, d, e.

Fig. 78, Male, S. B., foothills of mountains, Nov. 28, 1891; Author.

- a, Male, underside, Arrowhead Road, 4,000 feet altitude, Jan. 29, 1900; Author.
- b, Female, S. B. foothills, Feb. 5, 1896; Author.
- c, Female, underside, S. B. foothills, Oct. 10, 1896; Author.
- d, Female, white, dimorphic, Bakersfield, April 1, 1891; Author.
- e, Female, white, underside, San Bernardino plains, Dec. 12, 1895; Author.

Keewaydin is intermediate in size and color between Eurytheme and Ariadne, and is called the spring brood, but really it is found

at all seasons, but is probably more abundant in spring and autumn than in either summer or winter. It is a fully civilized species, and frequents the cultivated alfalfa fields in preference to the wild pastures of the plains and hillsides.

This albino female is also unnamed.

79. Pallida. 80. Intermedia. 81. Autumnalis. 82. Fumosa.

These are names that have been given to minor varieties of the Keewaydin form of *Eurytheme*, but I esteem the varieties as very minor indeed, for Keewaydin, the basis of them all, is itself but a variety, as generally considered.

83. Colias Eriphyle.

PLATE X; Figures 83, a, b, bb, c.

Fig. 83, Male, Chinook, Montana, June 6, 1890; Author.

a, Male, underside, East Washington, no date; from W. H. Edwards.

b, Female, Chinook, Montana, June 6, 1890; Author.

bb, Female, Pueblo, Colorado, no date; from W. H. Edwards.

c, Female, underside, Pueblo, Colorado, no date; from W. H. Edwards.

Eriphyle never has any orange on the wings, but is one of the clear yellow *Coliads*; the key to the form is the deep Indian-yellow color of the underside of hind wings, shown in the Figures a, c; being about the same deep yellow as is seen on the same wing of another species, *Chrysomelas*, on another Plate, XI, and by this color the species is at once recognized. You will notice that the females vary greatly in size; the two selected are the extremes in that direction, that my cabinet affords.

Eriphyle is not known on the West Coast to the south of the Canada line; the type came from British Columbia, and the species extends eastward through Montana, and south to Colorado; but it is quite likely that it may be found plentifully enough in some parts of East Washington, East Oregon, and Idaho.

Nothing is known as to its habits, or its food-plants, except in a general way, as a member of the *Colias* family.

84. *Colias Harfordi*. Not elsewhere illustrated in accessible form.

PLATE X; Figures 84, a, b, bb, c.

Fig. 84, Male, Mormon Pass, S. B. Mts., June 22, 1897; Author.

a, Male, underside, S. B. Mts., May 20, 1882; Author.

b, Female, San Bernardino plains, May 24, 1895; Author.

bb, Female, San Bernardino plains, June 7, 1897; Author.

c, Female, underside, San Bernardino plains, July 23, 1900; Author.

Harfordi, and the next species, Barbara, are twin forms; were discovered the same year, in the same region, and by the same collector, Mr. H. Edwards, who, in later years came to the conclusion that they were but different forms of the same species. I have myself followed this butterfly continuously for many years, and have arrived at the same conclusion, although there are some unexplained points still remaining. Originally, Harfordi was supposed to be the paler species, and Barbara the darker, deeper yellow form, and on that plan I have arranged them on this plate.

Harfordi is extremely local, being found only in the San Bernardino and Santa Barbara Mountains; and Barbara has the same habitat.

The larval food-plant is *Astragalus crotolaræ*, popularly known as "rattle-weed," because when ripe the seeds rattle in the pods; it is also known as "loco weed," loco meaning crazy or insane, because the use of it as food for horses causes them to act as if poisoned, and their eyesight to become affected as if short-sighted, so that they stumble at an obstacle before they have reached it. Bees, also, feeding on the blossoms become stupefied, and die.

85. *Colias Barbara*. Never before figured, except in Edwards' costly work.

PLATE X; Figures 85, a, b, bb, c.

Fig. 85, Male, Arrowhead Road, S. B. Mts., Jan 29, 1900; Author.

a, Male, underside, S. B. Mts., foothills, Nov. 23, 1897; Author.

b, Female, foothills S. B. Mts., no date; Author.



- bb, Female, Potato Canyon, April 22, 1891; Author.
c, Female, underside, Banning, Cal., April 3, 1891;
Author.

The colors of the upper side of these two forms have been described as canary-yellow for Harfordi, and lemon-yellow for Barbara; with the further distinction of Indian-yellow for the underside of hind wings of Barbara. I have a large series of both forms, and I find that the black border on Barbara is uniformly broader than on Harfordi; all this is fairly shown on the plate, so that you can form your own conclusions. It appears to me that there are two good forms shown, and that, although the two forms are known to intermarry, and behave altogether as one species, as I proved abundantly many years ago, and as stated in Edwards' work, there is no good reason why the two forms should not bear their own separate names; for, as I have said before, names are of no use but to designate and identify different forms.

86. *Colias Occidentalis*. Previously illustrated only in Edwards' Butt. N. A.

PLATE XI; Figures 86, b, bb, c.

- Fig. 86, Male, Vancouver Island, June 21, 1891; Author.
b, Female, Vancouver Island, June 21, 1891; Author.
bb, Female, Victoria, B. C., July 2, 1891; Author.
c, Female, underside, Tacoma, Wash., July 10, 1891;
Author.

Occidentalis and *Chrysomelas* the next species, are much alike on the upper side, but beneath *Occidentalis* is gray, and *Chrysomelas* is Indian-yellow. *Occidentalis* is the more northern species, inhabiting Vancouver Island and other adjoining regions, but not coming far into the States south of Puget Sound. I have never found it abundant, nor even common in any place, and count it a rarity everywhere.

Nothing is known about its habits or particular food-plant.

87. *Colias Chrysomelas*.

PLATE XI; Figures 87, b, bb, c.

- Fig. 87, Male, Mendocino County, Cal., June 14, 1891;
Author.
b, Female, Northern California, May 24, 1891;
Author.

bb, Female, Vancouver Island, July 2, 1891; Author.

c, Male, underside, Lake County, Cal., June, 1894;
Author.

Chrysomelas I have found to be rather widely spread, and have taken it from Vancouver Island on the north to Lake County on the south, as noted in the data above given. It is much more common than *Occidentalis*, and in some places it is rather common, and several specimens can be taken in a half-day. Many examples cannot be separated from *Occidentalis* by the upper side, but the underside is always distinct in its peculiar deep yellow color, when contrasted with the gray of *Occidentalis*.

Nothing is known of the habits of *Chrysomelas*.

88. *Colias Alexandra*.

PLATE XI; Figures 88, b, c.

Fig. 88, Male, Pendleton, Eastern Washington, Aug. 10,
1890; Author.

b, Female, Colorado, no date; from Dr. Barnes.

c, Female, underside, Shoshone, Idaho, Aug. 1, 1890;
Author.

This, and the next, *Edwardsi*, are twin species, like the two preceding, and are very similar in appearance, so that sometimes they are difficult to separate. Generally, *Alexandra* is a little larger in size, the hind wings are broader, the discal spot is pearly, and the underside of hind wing is somewhat chalky-white.

The range of *Alexandra* is from the Rocky Mountains to the Sierra Nevadas, but its southern limit is about the north line of Utah. On the West Coast, therefore, the only place to find this species is Eastern Washington and Oregon.

89. *Colias Edwardsi*. Not previously figured in accessible form.

PLATE XI; Figures 89, b.

Fig. 89, Male, Portland, Oregon, Aug. 20, 1890; Author.

b, Female, Portland, Oregon, Aug. 20, 1890; Author.

Generally a trifle smaller than the preceding (though the female here is unusually large, and is therefore misleading,); the wings are more pointed in shape, and the discal spot on underside of hind wing is orange instead of pearly.

Edwardsi is sometimes considered as a western variety of *Alexandra*, and if it occupied the same territory with *Alexandra*

the statement might have more force, but so far as I know the two species inhabit quite different localities, neither intruding upon the territory of the other, the Cascade Range of mountains forming a barrier between the two species.

Edwardsi is a rare species, and I have never taken very many of them in any place.

90. *Colias Christina*. Not elsewhere illustrated in accessible form.

PLATE XI; Figures 90, b, bb.

Fig. 90, Male, Central Montana, July 10, 1890; Author.

b, Female, Shoshone, Idaho, July 24, 1890; Author.

bb, Female, albino, Shoshone, Idaho, July 24, 1890; Author.

The Author of this species says of it that, "It is the most variable Coliad in America." The deep orange of the male Christina is similar to that of Eurytheme, but the pattern of it is unlike, in that the orange of Christina is deepest at the margin, and evenly grows less deep till near the base there is little or no orange, but only the regular yellow ground-color of the wings. The albino females prevail, and the normal-colored one is extremely rare, being apparently nearly extinct. On the underside the hind wings, especially of the females, are thickly dusted with black scales.

Christina inhabits British America immediately east of the Rocky Mountains, and comes south into Montana a little, but not far. It may be looked for in the region west of the Rocky Mountains and east of the Cascade Range, in Idaho, Oregon and Washington, though I am not aware that any specimens of it have as yet been taken in those regions.

91. *Colias Astræ*. Not figured elsewhere except in Butt. N. A.

PLATE XI; Figures 91, b.

Fig. 91, Male, Central Montana, July, 1890; Author.

b, Albino Female, Montana, July, 1890; Author.

Astræ is believed to be the paler, southern, form or variety of Christina, but the fact is yet to be proved. It inhabits generally the same territory, but does not go so far north and comes much further south than Christina, even to Northeastern California, but it is quite rare, and not enough is at present known about it or its range to enable me to say positively much about it. I do not know

of any normal-colored female, but only the albino; it therefore appears that the normal has become extinct, as I have predicted the normal females of all *Coliads* will eventually become. The underside of *Astræ* is dusted with black scales still more thickly than *Christina*.

Astræ, like *Christina*, may be looked for in Eastern Washington and Oregon, on the smaller mountains and foothills, in June and July, as I already have specimens taken in Northeastern California by Mr. Stephens in 1894.

92. *Colias Emilia*.

PLATE XI; Figures 92, b, c.

Fig. 92, Male, Ellensburg, Wash., May 10, 1890; Author.

b, Female, Tacoma, Wash., May 4, 1890; Author.

c, Female, underside, Ellensburg, Wash., May 10, 1890; Author.

Emilia has the narrowest black margin of any *Coliad* that I know of in the world; some of the males have but a mere line of black on the margin, much less than the example here figured. Many kinds of *Coliads* show that the veins are free of black, and cut across the black margin, showing the yellow vein through the black, but the veins of *Emilia* carry the black and are lined with it on the yellow disk and inside the margin proper, as you see by this female figure b.

All the examples that I have of *Emilia* were taken within the State of Washington, as noted in the preceding data.

Nothing is known as to the habits or the food-plant of *Emilia*.

93. *Colias Scudderi*.

PLATE XI; Figures 93, Male; b, Yellow Female; c, White Female.

All these examples were taken by me in the Judith Mountains of Montana, in July, 1890. I have never seen the species on the West Coast, within the territory covered by this work, but in some books it is said to occur in British Columbia, and therefore I give the accompanying figures of it to cover the possibility of such an occurrence.

94. *Colias Meadi*.

PLATE XI; Figures 94, Male; b, Female; from T. L. Mead.

This butterfly is not known to fly elsewhere than in the Rocky Mountains of Colorado; but I think it is likely to be found in the



high mountains of the West Coast, and will therefore give a figure of it. Meadi is quite strongly tinted with green, which color is more especially seen on the underside.

95. *Colias Elis*.

No figure.

An arctic species, said to greatly resemble Meadi, and by some authorities thought to be the same. May be found in Alaska, possibly.

96. *Colias Behri*.

PLATE XI; Figures 96, Male; b, Female; c, Underside of Female.

This queer little Coliad is an Alpine thing, from the high, cold valleys of the Sierras, from Yosemite, northward, at an altitude of about 10,000 feet. It is small enough and dusky enough to be an exile from the north pole itself, apparently. All these examples were taken by Mr. Lember, my correspondent and friend, who lived there a hermit's life, and at the last died there a hermit's death, and whose cowardly, Mexicanesque ambushment and assassination remain to this day unavenged.

Genus TERIAS.

This small genus is similar in some points to *Pieris*; and in some resembles *Colias*. It is less arctic in habit, and never has the round silver spot on underside of hind wing that distinguishes all the members of the genus *Colias*. Some of the species have the same food-plant, trifolium.

97. *Terias Nicippe*.

PLATE XII; Figures 97, Male; b, Female.

Nicippe is almost universal all over the United States, being rare in the New England States, and wholly absent in the north-west part of the country west of the Cascades, being present on the Coast only in Southern California, and is seen there only in limited numbers.

The food-plant is cassia, and other leguminous plants.

98. *Terias Mexicana*.

PLATE XII; Figures 98, Male; a, Male.

Terias Mexicana is found in the United States only in the southern part of Arizona, and therefore is not of great interest gener-

ally. It is a tropical species that finds its northern limit in Arizona. It has never been taken in any other place north of the Mexican border, that I know of.

99. *Heliconia Charitonía*.

PLATE XII; Figure 99, Male, Mazatlan, Mexico, Jan., 1887; Author.

This is a tropical species, and is very rarely seen north of Mexico, though, as it flies there in the winter, it seems as if it might come north along the Colorado River into Arizona and Southern California in the summer.

The larval food-plant is passion-vine.

100. *Danaís Plexippus*.

PLATE XII; Figure 100, Female; Southern California, 1899; Author.

This is one of the best-known butterflies in the whole country, it is very large, and is tame, flying about the habitations of men without fear. It has been introduced from this country into England, where it is welcomed and made much of as being the largest butterfly in the British Isles. The sex-mark by which it can be recognized is a black spot near the middle of hind wing, as seen in example number 102. The figure of *Plexippus*, being a female, shows no such spot, but all the males have the spot on upper side of hind wing.

The larval food-plant is *asclepias*, the milkweeds.

Habitat: All the United States except the northern tier of States across the continent.

101. *Danaís Berenice*.

PLATE XII; Figure 101, Female; Mazatlan, Mexico, Jan., 1887; Author.

Berenice is a species belonging to the tropical countries, and is but scantily represented in the Southern or Gulf States, and possibly, in still more limited numbers, in Arizona. West of Arizona it is replaced by the variety next following, as *Berenice* does not fly in California or any of the West Coast States.

102. *Danaís Strigosa*.

PLATE XII; Figure 102, Male; Southern California, 1903; Author.

Strigosa is common in Southern California, but its northern flight is limited by the Tehachapi Mountains, beyond which I have

never seen it flying. It is very much like Berenice, the only difference being the light lines along the veins of the hind wing. I call it the Desert Danaïs, as it likes best the dry border lands near the desert proper.

FAMILY NYMPHALIDÆ.

This marks a grand division, and now we come to the Nymphs. This family includes most of the more showy and beautiful butterflies, and consists of four genera of four-footed, and one genus of six-footed species. The fact that a butterfly has six feet, or only four, as the case may be, does not count for much, being apparently merely a minor point. In the four-footed species the front pair of legs are aborted, and exist only in part, being represented only as a pair of "lappets."

Sex-marks: In most of these genera the apparent difference between the sexes is very small, and it is sometimes difficult to determine the sex; in these cases the lappets afford some help; the vestiture of the male lappets being much more dense and long than that of the females, so that by a comparison of several specimens a conclusion is arrived at.

103. *Mechanitis Californica*.

No figure.

This species is erroneously included in the fauna of California, as it does not exist here. It was stated to have been found near Los Angeles, but there must have been a mistake about it, as for the last forty years no specimen has been taken.

To give an understanding of the matter, I will state that the appearance of the butterfly is somewhat like that of *Heliconia*, being a little smaller, the wings being similar in shape; the fore wings are black, with orange spots, and the hind wings are red, with a central patch of black, similar in shape to the long white spot on the hind wings of *Heliconia*.

104. *Agraulis Vanillæ*.

PLATE XII; Figures 104, Male; a, Underside of Male.

Vanillæ is a very common butterfly in the Southern or Gulf States. It is not a native of the West Coast, but was introduced into the country over the Southern Pacific Railroad, soon after

that was opened up across the interior country to New Orleans, about 1885. Since that time it has become very abundant in California, especially in the southern part, and has become a pest, as the larvæ feed upon the leaves of the passion-vine, so that the vine becomes a nuisance on account of the caterpillars, and has to be removed.

Many introduced plants prove to be more vigorous and aggressive than the native ones; and so it is with this introduced butterfly; it is hardy and restless and, like another introduced species, *Rapæ*, it flies at all times and at all seasons, seemingly bent on conquest. And now it is, like *Rapæ*, so well established that it has become a fixture for all time; just the same as in ornithology, the English sparrow has become a permanent inhabitant of America.

105. *Euptoieta Claudia*.

PLATE XII; Figure 105, Male; Central Montana, July, 1890; Author.

This species is said in some books to inhabit Southern California and Arizona; and I insert this plate of it on that account; but I have never seen one of them flying west of the Sierra Nevada divide, and I think that it is not found in any part of the West Coast territory. Yet it is likely to be found in the warmer parts of the Coast States, in the dry, hilly sections, at any time. As the figure shows, it has the same system of spotting as the *Argynnis*, but no American *Euptoieta* ever has any silver on any spots, and all the markings of both sides have a pale and washed-out appearance.

Genus ARGYNNIS.

This group of butterflies, many of them large and handsome, is of well-nigh universal occurrence, being found high up on the mountains at timber-line, and so on down to the lower heights, and to the level of the sea. They are moreover very evenly distributed, in that no one group of large ones or of small ones are found solely at high or low altitudes. From 3,000 to 5,000 feet elevation, however, is where they do most abound, and on the breezy, upland slopes of the hills and mountains, rather than on the plains. All the *Argynnis* are fond of feeding on flowers.

In ovipositing, some kinds walk about on the dead leaves and rubbish under the small bushes, and push the ovipositor down in among the debris and oviposit just like a grasshopper; others drop their eggs while flying over suitable places. At the time when the eggs are laid, the grass and small plants are all dry and dead, so that there is nothing for the young larva to feed upon if it should hatch. The egg is thimble shaped, white at first, but turns black in twenty days, or just before hatching, and the larva can be seen through the transparent shell before it is hatched. In hatching, the larva eats its way through the egg-shell, devouring all of it usually; it then goes into lethargy without eating anything else, and thus it hibernates, a tiny thing, not half so big as a pin-head, naked, without any cocoon or other covering, in the wet and frozen rubbish, till the leaves of its plant shall grow in the spring, some eight or nine months of sleep. A most marvelous story.

The larvæ feed on *Viola*, it is said, but I am sure that there must be some other food-plant. Like the larvæ of *Parnassius*, the *Argynnis* are nocturnal, and thus the difficulty of observing them is increased, and there is yet much to learn about them.

Sex-marks: The lappets, and the abdomens; the tip of the male body is somewhat knobbed, and has a sort of fringe on upperside as is well shown on Plate XIII, Fig. 115, a. The body of the female is larger and tapers to a point. The female is always paler than the male, except those species the females of which are black.

106. *Argynnis Nokomis*.

No figure.

Nokomis is a very large butterfly from Arizona; it is of the same group as *Leto*, and might easily be mistaken for *Leto*; the female is of the black kind, same as *Leto*, there being no normal-colored female. The male is somewhat redder on the upper side than *Leto*, and the upper side of the female is rather brown than black.

107. *Argynnis Nitocris*.

No figure.

Nitocris is another of the Arizona *Argynnis* that have black females; it is also of the *Leto* type, similar to *Nokomis*, but with stronger and more contrasting colors, the upper side of the female being blackish rather than brownish. All of these three species,

Nokomis, Nitocris, and Leto, are so much alike that if you have only one specimen, you may be puzzled to decide which one of the three it is.

110. *Argynnis Leto*.

PLATE XII; Figures 110, a, b, c.

Fig. 110, Male, Sisson, Cal., July 20, 1891; Author.

a, Male, underside, Mt. Shasta, July, 1891; Author.

b, Female, Portland, Oregon, Aug. 1, 1890; Author.

c, Female, underside, Portland, Oregon, Aug. 1, 1890; Author.

Leto has no normal female but all the females are like the one here shown, black, or more strictly, brown-black, with sub-marginal band of bright golden-yellow. The question whether there ever were any normal-colored females in these three species, is an interesting one. Leto is a fair type of these three species having only black females. All these three were evidently at one time but one species, but climatic or other influence of environment has caused some small differences in their markings and has separated them somewhat in territory, for between Leto and the other two there is a wide strip of unoccupied territory, not inhabited by any one of them.

111. *Argynnis Letis*, n. v. Not elsewhere illustrated.

PLATE XII; Figure 111, Male; Sisson, Cal., August, 1891; Author.

Letis appears to be a variety of the preceding, Leto, in which the dark markings are obsolescent, especially on the apices of fore wings and over all of the hind wings, as is shown very well on the plate. There is no known female, either normal or black, for this variety. I have taken many of the ordinary black females, but no one of them shows a corresponding obsolescence.

112. *Argynnis Carpenteri*. Elsewhere illustrated only in Edwards' Butt. N. A.

PLATE XIII; Figures 112, a, b.

Fig. 112, Male, Vancouver Island, July, 1891; Author.

a, Female, underside, Vancouver Island, July, 1891; Author.

b, Female, Vancouver Island, July, 1891; Author.

This species is by some accounted as a western representative or variety of the eastern *Cybele*; it is a good deal smaller than



Cybele, and the markings are modified or different, so much so that it seems unreasonable to suppose that they both are equivalent to one species. *Carpenteri* is a low-land flyer, inhabiting the plains and valleys, and never being found in the mountains; and it is also a wide-flying species, being found scantily over wide areas of country, and not abundant in any one place. The dark basal area extends about half way across the wings.

113. *Argynnis Cypris*. Not elsewhere illustrated.

PLATE XIII; Figures 113, a, b.

Fig. 113, Male, Greenhorn Mountains, Cal., 8,000 feet altitude, June, 1885; Author.

a, Underside of Female, from W. H. Edwards, 1886.

b, Female, no data, from W. H. Edwards, 1886.

Cypris is sometimes called the western form of the eastern *Aphrodite*. It is smaller than *Aphrodite*, and the markings are generally lighter than the eastern form. I may here remark that the modern tendency, as to these, and other so-called "representative" species, is to a complete severing of the relationship and the establishment of all such forms as different species, as is right and proper and inevitable eventually.

Cypris is a true mountain butterfly, and inhabits the mountains up to the tops or utmost heights, and is not seen on the lower slopes and valleys, being just the reverse of *Carpenteri*, although the two species may at first sight look a little alike. On the West Coast *Cypris* is very scarce, insomuch that in twenty-five years I have taken only half a dozen males, and never yet a female example.

114. *Argynnis Nausicaa*.

PLATE XIII; Figures 114, a, b.

Fig. 114, Male, Senator, Arizona, 1897; Dr. R. E. Kunze.

a, Male, underside, Arizona, 1897; Dr. R. E. Kunze.

b, Female, Arizona, 1897; Dr. R. E. Kunze.

This magnificent butterfly is known only from Arizona; there it is common enough. It would seem as if this species were a close relative of *Nitocris* and *Nokomis*, and that like those two it ought to have a black female, but no dimorphic female of *Nausicaa* is known at this day.

115. *Argynnis Hippolyta*.

PLATE XIII; Figures 115, a, b.

Fig. 115, Male, Portland, Oregon, July, 1889; Author.

a, Male, underside, Portland, Oregon, July, 1889;
Author.

b, Female, Portland, Oregon, July, 1889; Author.

Hippolyta is a high mountain species, and inhabits all the higher mountains of Northern California and Oregon, and perhaps of Washington also; it is only found at great heights, about 9,000 feet elevation, and not on the lower slopes or elevations.

116. *Argynnis Oweni*.

PLATE XIII; Figures 116, Male; a, Male, underside, Mount Shasta; Owen.

This typical example of *Oweni* was taken on Mt. Shasta by Prof. Owen, for whom it was named, at about 10,000 feet elevation, and later it was sent to me by Mr. Edwards, the Author of the species, soon after it was named.

It appears that *Oweni* is a variety of the preceding, *Hippolyta*, the differences being but slight, and often you cannot decide whether a specimen belongs to the one or to the other; but that is the case with nearly all variations.

117. *Argynnis Columbia*.

No figure.

Columbia was named in 1877 by H. Edwards, from specimens from Lakes La Hache and Quesnelle. It is rather a large-sized and a pale-colored butterfly for that northern locality. The key to the species seems to be the spots in the middle of the upper side of hind wing, which spots are curved into crescents, or the upper ones are bent into V-shaped angles. The spots are a little obsolescent, so that the crescents and angles are connected together but little, or not at all.

118. *Argynnis Hesperis*.

PLATE XIII; Figures 118, a.

Fig. 118, Female.

a, Male, Colorado, 1880; Nash.

This is a Colorado species, and is credited to Utah and Montana; it does not come into our territory, except Utah, though probably it may be taken in Nevada, and perhaps in eastern Ore-



gon and Washington. The basal part of the wings are, as you see, very dark, and this seems to be its most prominent characteristic.

119. *Argynnis Bremneri*.

PLATE XIII; Figures 119, a, b.

Fig. 119, Male, Puget Sound, Wash., August, 1891; Author.

a, Underside of Male, Puget Sound, Wash., August, 1891; Author.

b, Underside of Female, Puget Sound, Wash., August, 1891; Author.

Bremneri is the darkest of all our *Argynnis*ids on the underside, the males being almost black near the center of the wing. It flies on the low lands along the sea coast, and never, so far as I know, at any considerable height on the hills, nor at a great distance from the ocean.

v. *Sordida*, n. v. *merely not black as Gunders '32*.

I have taken in that locality a variety, indistinguishable on the upper side, but which on the underside of hind wings is very different, the white or buff spots being almost obliterated, and the whole wing suffused with a sordid rusty color. This form I tentatively call *Sordida*. It bears the same relation to *Bremneri* that *Hydaspe* does to *Zerene*; each variety being a rusty or cinnamon-colored variety of the parent species, we may call them. The figure of *Sordida* was crowded out at the last moment by other figures which could not possibly be left out.

120. *Argynnis Zerene*.

PLATE XIV; Figures 120, a, b.

Fig. 120, Male, Northern California, no data, 1882; W. H. Edwards.

a, Female, underside, Lake County, Cal., June, 1894; Author.

b, Female, Lake County, Cal., June, 1894; Author.

Zerene is one of the prominent species of mountain *Argynnis*ids of Northern California, being very abundant everywhere in the mountains of California and Oregon, and extending south in the high Sierras to Lake Tahoe, which locality seems to be its southern limit. The spots on the underside of hind wing are large, and buff in color, and are not silvered in either sex, as a rule.

121. *Argynnis Hydaspe*. Never before illustrated.

PLATE XIV; Figure 121.

Fig. 121, Male, underside, Sisson, Cal., 1891; Author.

Hydaspe is a variety of *Zerene*, in which the underside is obsolescent as to the buff spots, and the whole wing is suffused with a cinnamon color, as is well shown by the Plate. Both sexes afford this variety, which is found wherever *Zerene* may be common. The spots are never silvered in this variety.

122. *Argynnis Monticola*.

PLATE XIV; Figures 122, b.

Fig. 122, Male, Lake County, Cal., June, 1894; Author.

b, Underside of Female, Sisson, Cal., June, 1891;
Author.

Monticola is a common *Argynnid* of Northern California, being abundant everywhere in the mountains, and it also extends in more limited numbers through Oregon, Washington, Idaho and British Columbia. On upper side it looks similar to *Zerene*, but on the underside it is pinkish in color of the hind wing, the spots being straw-colored in the male, and usually silvered more or less in the female.

123. *Argynnis Purpurascens*.

PLATE XIV; Figures 123, b, Females both, Sisson, 1891;
Author.

This is a variety of the preceding, the female only being the subject of the variation. This variation manifests itself in an exuberance of size, and of color, both on the upper and on the underside, the underside being suffused with a purplish tint on the underside of hind wing. The large purple specimens are especially splendid when fresh, but the purple tint soon fades.

124. *Argynnis Rhodophe*.

PLATE XIV; Figures 124, a, Males, Vancouver Island,
July, 1892; Author.

A very dark species, allied, apparently, with *Bremneri*, and found in the same latitude, but more in the interior, and on the mountains, while *Bremneri* is on the plains, and near the coast. The dark spots on upper side are very black and large, and those of the median band are all connected together. On the underside the disk or center of the hind wing is very dark, like *Bremneri*,



and sometimes a brown blotch obliterates all markings except the straw-colored spots.

125. *Argynnis Behrensi*.

PLATE XIV; Figures 125, a, Males, Mendocino County, Cal., June, 1892; Author.

Behrensi is a very local species, and if you want to find it you must visit the hilltops and hog-back ridges of Mendocino County, in July. It was discovered by Mr. James Behrens, a San Francisco collector, who accidentally ran upon it, and it was named for him by Mr. Edwards, to whom it was submitted. I have always found it very scarce in its local habitat, and never succeeded in getting but few specimens in any one season. The Plate illustrates the species so well that it is not necessary to add words of description.

126. *Argynnis Coronis*.

PLATE XIV; Figures 126, b, c.

Fig. 126, Male, Southern California, June, 1886; Author.

b, Female, Mount Shasta, August 15, 1890;
Author.

c, Underside of Female, Tehachapi Mountains,
July, 1889; Author.

Coronis is a very common and wide-spread species in California and adjacent countries; in fact, it might be difficult to say just where in all this region it is not to be found. But that is not the worst of the matter; it is inconstant, as perhaps so wide-spread a species has a right to be, and, as Mr. Edwards once wrote me, "for every degree of latitude it puts on a new face." But there is one typical character which it carries everywhere, north and south, east and west, and that character can be found on the underside of the hind wing; the band. I mean the wide, sub-marginal band of clear golden color, just inside the outer series of silver lunules. *Coronis* is moreover one of the three species of the West Coast that shows a little green on the underside of hind wing; see 128; 129.

127. *Argynnis Callippe*.

PLATE XIV; Figures 127, b, c.

Fig. 127, Male, Southern California, June 25, 1886;
Author.

b, Female, Southern California, June 17, 1903;
Author.

c, Female, underside, Ventura County, Cal., July,
1894; Author.

Callippe is the most tropical *Argynnis* that we have; it flies further south than any other, and is not found at the north at all; I have never seen it north of the locality noted above, Ventura County. It is a plains species, and never can be found far up on the hills and mountains, but in the little, dry, hot, valleys, it lives and seems to like the torrid temperature of a hot June day. Its life as a butterfly is very short, the shortest of any *Argynnis* that I know of, being only a few days in length.

128. *Argynnis Nevadensis*.

PLATE XV; Figures 128, b, c.

Fig. 128, Male, Truckee, Cal., July, 1891; Author.

b, Female, Truckee, Cal., July, 1891; Author.

c, Female, underside, Truckee, Cal., July, 1891;
Author.

Nevadensis is extremely common, it flies along the foothills of the Sierra Nevadas in countless numbers, in Eastern California and Nevada. The key-note of this species is the green underside of hind wing, it being the greenest of the three species which show green about the silver spots beneath, these three being *Coronis*, *Nevadensis*, and *Edwardsi*. In this species the green is seemingly washed on the whole wing after the other colors are in place.

129. *Argynnis Edwardsi*.

PLATE XV; Figures 129, b.

Fig. 129, Female, Central Montana, July, 1890; Author.

b, Female, underside, Sierra Nevadas, 7,500 feet
altitude; Author.

Edwardsi is the grandest *Argynnis* that flies on the mountains of the West Coast. It is a true mountain butterfly, and is not ever seen on the lowlands or in the valleys. As you may guess from the great broad wings, it flies with the most rapid flight, and it is also very scarce, and apparently never alights, so it is evident that it is not easily captured. This is the third species that shows green on hind wing beneath. It is not uncommon to see it flying over the snow-banks that in July remain yet unmelted about the alpine peaks where it lives.

130. *Argynnis Liliana*.

PLATE XV; Figures 130, b, c.

Fig. 130, Male, Central California, June 26, 1894; Author.

b, Female, Central California, June 26, 1894;
Author.c, Female, underside, Central California, June 26,
1894; Author.

This is one of the most elegant and showy of all our *Argynnis*s, though on the Plate it looks much like any of the others. It is a hill species, inhabiting neither the mountains nor the plains, but the more moderate hills, and around the bases of the greater mountains. It is very local, and although not one is in sight, yet there may be a plenty of them only a short distance away from you. Their flight is gentle and slow for an *Argynnis*, and they are very easily taken, for they love to stop and feed on all the flowers that they see, and they are not at all wild, insomuch that you may at times catch them in your fingers as they sip the blossoms.

131. *Argynnis Baroni*. Not elsewhere illustrated.

PLATE XV; Figures 131, b.

Fig. 131, Male, given me by O. T. Baron, 1881.

b, Female, Central California, June, 1894; Author.

When first named Mr. Edwards thought this was an aberrant form of *Liliana*, and so set it down in his catalogue of 1884, but later he must have revised his opinion. At any rate it is a good variety or sub-species, for I have hunted them out on their native grounds to my complete satisfaction. *Baroni* is a most striking, melanic variety, or else a distinct and separate species. This male specimen was given me by Mr. Baron himself, at the time it was named, or soon after; and in later years I have visited the typical locality several times and have studied the matter exhaustively. All the lines and spots are heavier, and are run together into maculate bands, so that it has decidedly a dark appearance, and on the underside there is an excess of silver, outlined with black.

132. *Argynnis Rupestris*.

PLATE XV; Figures 132, b, c.

Fig. 132, Male, Shasta Mountains, June, 1890; Author.

b, Female, Shasta Mountains, June, 1890; Author.

c, Female, underside, Shasta Mountains, June,
1890; Author.

Rupestris is a mountain species, found everywhere in the higher altitudes of the Northern California mountains, and extending doubtless into Oregon, and along the Sierra Nevadas to the north, but not far to the south, but possibly to the latitude of Lake Tahoe, though I have no data extending that far south. The underside is very rusty looking, and the spots are seldom silvered at all, though occasionally a few of the apical and marginal spots are slightly silvered. *Rupestris* is variable, and in different localities will bear different aspects, so as to puzzle the collector.

132a. *Argynnis Irene*.

No figure.

Irene is a variety, sometimes set down to *Zerene*, and again to *Rupestris*, by different writers. It is that variety which has all spots on underside of hind wing well silvered. Neither typical *Zerene* nor *Rupestris* has silver on the spots beneath. I incline to the belief that *Irene* is a variety of *Rupestris*, and so place it.

133. *Argynnis Laura*.

PLATE XV; Figures 133, a, b, c, S. Cal. Mountains, June, 1888; Author.

Laura is of a reddish tint; the dark markings are not broad, but are distinctly cut, and not obsolescent. The underside is light-yellowish, the spots large and well silvered, and the dark or black lines and shadings seen on some other kinds are absent. The species is well represented on the plate, except that the silver of the underside is not brightly shown, as that shining of the silver seen in nature is one of those things that cannot be caught by the camera, nor shown by the illustrator's ink.

134. *Argynnis Laurina*, n. v. Not elsewhere illustrated.

PLATE XV; Figure 134, Male, taken with *Laura*, June 20, 1888; Author.

Laurina is an unsilvered *Laura*. It flies with *Laura*, occurring in both sexes, and on the upper side cannot always be distinguished from *Laura*, but on the underside both the fore and the hind wings are very different, as is fairly well shown by the Plate, the apices of fore wings and the margins of hind wings being overlaid with a buffy color that covers up the spots and markings, and the usual silver spots of hind wings are not silvered at all, being flat buff, as pallid as in *Adiante*; though in the female a few of the apical spots will occasionally show a faint silvering.



This variety was discussed by Mr. Edwards and myself for some time before he retired from the pursuit of butterflies, and it was his intention to publish it as *Argynnis Wrighti*; but as he never did so publish it, I will now give it the varietal name *Laurina*.

135. *Argynnis Macaria*.

PLATE XV; Figures 135, a, aa, b, c.

Fig. 135, Male, Greenhorn Mountains, June, 1888;
Author.

a, Male, Greenhorn Mountains, June, 1888;
Author.

aa, Male, underside, Greenhorn Mountains, June,
1888; Author.

b, Female, Greenhorn Mountains, June, 1888;
Author.

c, Female, underside, Greenhorn Mountains, June,
1888; Author.

As compared with *Laura*, *Macaria* is a trifle larger in size, and is paler in color. There is a peculiar feature in *Macaria* that does not appear in any other California *Argynnis*, namely, that in some specimens there is a paling or a fading out of the basal part of all wings from the body half way across the wings; this paling is apparent in the Plate in figure *a*; the female, *b*, also shows a little of the same paleness at base. This feature is seen in about one-third of the specimens of *Macaria* that I have ever taken, and, being not uncommon, is, evidently, part and parcel of the species.

136. *Argynnis Semiramis*.

PLATE XVI; Figures 136, b, c.

Fig. 136, Male, San Bernardino Mountains, May, 1887;
Author.

b, Female, San Bernardino Mountains, June, 1899;
Author.

c, Female, underside, San Bernardino Mountains,
June, 1902; Author.

Semiramis was discovered by the Author about twenty years ago, on the San Bernardino mountains, and was named by Edwards in a year or two afterwards. No other *Argynnis* flies on these mountains, but *Semiramis* is abundant enough, and holds complete possession. I have not taken this species on any other

mountain, so that it is apparently more restricted in range than any other *Argynnid* of the West Coast. The key to the species is the peculiar obsolescence of the markings on upper side of the hind wings, especially near anal angles. *Semiramis* is very fond of feeding on flowers, particularly the blossoms of thistles, brodiaeas, and a species of dwarf vaccinium that grows in dense masses on the mountain top, and the scattered plants of yerba santa. The range in altitude is from 3,500 to 6,000 feet elevation.

137. *Argynnis Inornata*.

PLATE XVI; Figures 137, b, c.

Fig. 137, Male, Tenino, Wash., August 10, 1891; Author.

b, Female, Tenino, Wash., August 10, 1891;
Author.

c, Female, underside, Mount Shasta, Cal., August
25; Author.

Inornata is a butterfly that can live on the plains or upon the mountains, as it chooses; being exceptional in that respect. In size *Inornata* is rather large, and both sexes have strong dark markings on upper side, and strong and distinct beneath. It is quite a question as to where the "inornate" cognomen applies, unless it may be in the absence of silver on the spots beneath. It is the darkest butterfly on the West Coast, the markings being very broad and black, and the basal parts of the wings also very dark.

138. *Argynnis Adiante*.

PLATE XVI; Figures 139, b, c, aa.

Fig. 139, Male, Coast Mountains of Central California,
June, 1893; Author.

b, Female, Coast Mountains of Central California,
June, 1893; Author.

c, Female, underside, Coast Mountains of Central
California, June, 1889; Author.

aa, Male, aberrant, Coast Mountains of Central
California, June, 1889; Author.

Adiante is very peculiarly marked; on the upper side it resembles *Semiramis*, and on the under side it emphasizes the pallid obsolescence of *Laurina*, neither of which species lives anywhere near to *Adiante's* habitat, and both of which are interior mountain species, while *Adiante* inhabits a narrow strip of sea coast hills near San Francisco, and is not found outside that restricted dis-

trict, the hills of which are only a few hundred feet in elevation. *Adiante* has a weakness for sipping water at damp places by the roadside, and most of my specimens were taken under those conditions.

Figure *aa* of the Plate is photographic copy of a peculiar aberrant form, in which the pallid overwashing of the underside seems to have overflowed upon the upper. At the time of collection I noticed the abnormal appearance of the butterfly as it was flying about, and chased it desperately till I got it.

139. *Argynnis Atossa*.

No figure.

Atossa is a species that I have never met, although I have hunted over the ground where it is said to fly, many times, both before and after it was found. It is after the pattern of *Adiante*, with the upper side obsolescent, and the underside still more pallid or covered over with the overwash that obliterates the spots of the underside that are usually silvered. *Atossa* is said to fly in the Tehachapi Mountains, at the altitude of about 4,500 feet.

140. *Argynnis Eurynome*.

PLATE XVI; Figures 140, a, b.

Fig. 140, Male, Middle Park, Colorado, no date; Dr. William Barnes.

a, Male, underside, Middle Park, Colorado, no date; Dr. William Barnes.

b, Female, Central Montana, July 22, 1892; Author.

Eurynome inhabits the mountains and high plateaux of the interior country east of the Cascade Range, in Colorado, Montana, and British America, and it may be found in the whole of the interior region up to the Cascades, though I have never heard of such an occurrence, therefore I have included it in the list of our fauna. It has a greenish tint on underside of hind wings.

141. *Argynnis Bischoffi*.

PLATE XVI; Figure 141, Male, Yukon River, from B. Neumögen, 1881 (?).

Bischoffi has somewhat the appearance of the preceding, *Eurynome*, and has been called the northern form of that species; it has also on the underside the greenish or olive-greenish tint that marks *Eurynome*; it is a little smaller, and darker, as befits its

more northern habitat. The green of underside occurs in rounded spots, rather than in lines and stripes, as in the three green species before mentioned.

Bischoffi was first taken at or near Sitka, but I did not see one while I was there, in July, though I looked for some. Probably it was too early in the season.

142. *Argynnis Montivaga*.

PLATE XVI; Figures 142, a, b.

Fig. 142, Male, Truckee, Cal., July, 1893; Author.

a, Male, underside, Truckee, Cal., July, 1893;
Author.

b, Female, Truckee, Cal., July, 1893; Author.

Montivaga is a mountain butterfly, inhabiting the slopes and lower heights of the Sierra Nevadas, particularly on the eastern side, and is found at an elevation of nearly 8,000 feet, though its favorite habitat is lower down the slopes. It is very abundant indeed in some places.

143. *Argynnis Arge*. Not elsewhere illustrated.

PLATE XVII; Figures 143, a, b.

Fig. 143, Male, Truckee, Cal., July, 1892; Author.

a, Male, underside, Truckee, Cal., July, 1892;
Author.

b, Female, Truckee, Cal., July, 1892; Author.

Arge was named by Strecker, who claimed to have a large number of them, but who, nevertheless, seemed to be in doubt somewhat about this form. As his writings are not readily available, I will quote his remarks: "Smaller than Eurynome; expanse $1\frac{1}{2}$ to $1\frac{3}{4}$ inches; more red in color; sometimes mistaken for Montivaga; may be a Pacific coast variety of Eurynome. Beneath, the fore wings are tinged with red, except along costa; sometimes three or four marginal lunules nearest apex are silvered, oftener not. Hind wings beneath are reddish-buff, palest between the marginal lunules and the last row of silver spots, but nowhere dark; spots comparatively smaller than in Eurynome, all silvered, but not as heavily as in Eurynome; no tinge of green whatever in any example."

Now in all my experience I have never taken an Argynnid as small as $1\frac{1}{2}$ inch in expanse. As to Eurynome, the green of the hind wings beneath is one of the cardinal features, and when



Strecker cut that line he divorced Arge from Eurynome forever. Arge, therefore, is a form of Montivaga, "for which it is sometimes mistaken." The color of underside of hind wing is flesh-red.

144. *Argynnis Erinna*. Not elsewhere illustrated.

PLATE XVII; Figures 144, a, b.

Fig. 144, Male, Summit, Cal., 7,500 feet altitude, July, 1892; Author.

a, Male, underside, Summit, Cal., 7,500 feet altitude, July, 1892; Author.

b, Female, Summit, Cal. 7,500 feet altitude, July, 1892; Author.

This is a mountain butterfly, like the two preceding and the following species, and inhabits the same range of mountains. The characters of *Erinna*, as compared with its allies, are smaller size, deeper color, base of wings darker, black markings more heavy, and on underside of hind wing the spots are buffy and unsilvered, with the band scarcely less paler than the disk.

145. *Argynnis Eglesis*.

PLATE XVII; Figures 145, a, b, c.

Fig. 145, Male, Truckee, Cal., June, 1886; Author.

a, Male, underside, Truckee, Cal., June, 1886; Author.

b, Female, Donner Lake, Cal., June, 1886; Author.

c, Female, underside, Truckee, Cal., June, 1886; Author.

Similar to the preceding; a trifle larger in size, with the coloration similar to Arge; on underside the flesh-red of Arge is replaced with brownish or yellowish; the marginal lunules of the female are silvered, but usually no others are silvered in either sex, but are palest buff. In the Plate the pair of undersides shows effectually the variation of colors in the sexes.

Genus BRENTHIS.

This genus is composed of six species belonging to our fauna, all of them rather small in size, and all very similar in appearance and in size. The aspect of the group is somewhat like that of

Argynnis, but yet there are material differences on both sides, which justify the separation of this group from the Argynnis, although many writers include this group with the Argynnis. The species of *Brenthis* are nearly all of them arctic, or nearly so, in habitat. The sexes are indicated in the same way as the Argynnis.

146. *Brenthis Myrina*.

PLATE XVII; Figures 146, a.

Fig. 146, Male, Nipegon, Ontario, no date; D. Bruce.

a, Male, underside, no data; from W. H. Edwards.

This little butterfly is found in British America, and also in Alaska, at St. Michaels. It is very well known, but I have never seen it in flight, though presumably it flies within the territory treated of in this book.

146a. *Brenthis Pales*.

No figure.

This is merely a variety of the preceding, and it is a form with which I am unacquainted, and there is no literature in American publications referring to or describing it.

147. *Brenthis Triclaris*.

PLATE XVII; Figures 147, b.

Fig. 147, Male, Colorado Mountains, no data; from W. H. Edwards.

b, Female, underside, Middle Park, Colo.; from Mr. Nash.

This species is not yet noted as having been taken within our territory, but it is common in the Rocky Mountains of Colorado, and I know of no reason why it should not be taken on the mountains of the West Coast, or of British Columbia.

148. *Brenthis Helena*.

PLATE XVII; Figures 148, a.

Fig. 148, Male, from Colorado, no data; received from W. H. Edwards.

a, Male, underside, from Colorado, no data; received from W. H. Edwards.

Helena is, like the preceding, from the Rocky Mountains, and it is very likely that it will be found in many of the mountains of the West Coast, in good time.



149. *Brenthis Freija*.

PLATE XVII; Figures 149, a, b.

Fig. 149, Male, Rocky Mountains of Colorado, no data;
Dr. Barnes.a, Male, underside, Rocky Mountains of Colorado,
no data; W. H. Edwards.b, Female, Middle Park, Rocky Mountains, no
data; Dr. Barnes.

This is strictly an arctic butterfly, and is found from Labrador across the continent to near Behring Straits, and St. Michaels is the most southern point at which it has ever been taken that I have heard of, yet it is common apparently in Colorado, at no great altitude; there is no visible reason why it should not be abundant in the mountains of the West Coast, south of St. Michaels.

150. *Brenthis Frigga*.PLATE XVII; Figure 150, Male, Western Colorado, no
data; Dr. Barnes.

This is another of those Rocky Mountain species that has not yet been taken in the mountains of the West Coast, although there is no apparent reason for its absence.

151. *Brenthis Epithore*.PLATE XVII; Figure 151; Vancouver Island, June 21,
1891; Author; 151 b, Female, underside.

This is a common thing on the West Coast, being found as far south as Mendocino County, on the hills, everywhere in fact except the plains and the high mountains. It flies north to St. Michaels, Alaska, and doubtless to the Arctic Ocean. It is of very gentle flight, and is easily taken. In the more southern part of its range it becomes lighter in coloration, and is then known by another name, as follows:

152. *Brenthis Kremhild*.

PLATE XVII; Figure 152, Male, San Francisco Mts., Arizona, 1887; F. Stephens.

Kremhild is the southern form of *Epithore*, and is found in Utah and Arizona; but it seems to be separated from the places where *Epithore* is found by some few degrees of latitude and of longitude; a sort of neutral ground, wherein neither form will live. That singular feature, however, is not peculiar to this

butterfly alone, but other species, as closely allied as these two, apparently, have the same peculiarity, and will not occupy adjoining territory, but maintain a strip of neutral territory which neither will inhabit.

Genus MELITÆA.

This genus, like *Anthocharis*, is chiefly western; only two species are found in the Eastern States, while on the West Coast very many different species are found, the mountains especially being rich in the various forms. I have much pleasure in introducing to the world in this book several hitherto unknown and beautiful species of *Melitæa*, some of them, in fact most of them, having lain dormant in my cabinet for many years, awaiting this opportunity.

The genus characters are similar to those of *Argynnis*.

The sex-marks of all the *Melitæas* are: The male has a circular hairy brush at the tip of the abdomen; the female lacks the brush, the abdomen runs to a point, and has a sort of step or notch on the underside, which, in the larger kinds is quite marked.

Most or all of the *Melitæas* lay their eggs in masses on the plant, and in the early stages the larvæ are gregarious, later separating.

The food-plants are chiefly those of the *scrophularia* family, the pentstemons being perhaps the one plant especially favored by them, but many other plants will be eaten by the larvæ before they will starve.

153. *Melitæa Cooperi*. Not elsewhere illustrated.

PLATE XVIII; Figures 153, b, c.

Fig. 153, Male, Spokane, Wash., May 16, 1891; Author.

b, Female, Northern California, June, 1892; Author.

c, Male, underside; from O. T. Baron, 1887 (?).

Size, 1.7 inches; brown-black on upper side, the light spots being light buff. There is a marginal row of red lunules around both wings, on hind wings sometimes obsolescent. The key to the species is the single row of light spots sub-marginal on hind wing, the second or inner row of light spots being absent. It is said that the types were taken on Mt. Hood, but when I was there I did not see the species, although I looked for it, hoping to settle a doubt.

154. *Melitæa* Colon.

PLATE XVIII; Figures 154, b, c.

Fig. 154, Male, Eel River Bridge, Cal., May, 1894; Author.

b, Female, Mendocino County, Cal., June 20, 1893;
Author.c, Male, underside, Mendocino County, Cal., June
22, 1894; Author.

Colon is a hill species of Northern California, inhabiting the open places in the partially wooded country, where it is common. The types are said to have been taken on Mt. Hood, but I believe that the collector made a little mistake about that locality.

Colon is two inches or more in expanse; it is black in color rather than brown-black; the light spots are a little more dark buff than the preceding *Cooperi*; and the key to the species is the double row of sub-marginal light spots on upper side of hind wing, and the obsolete marginal red lunules on both wings, though sometimes the second row of light spots is obsolescent, more or less, as all these species are variable.

155. *Melitæa* [Quino.] Not elsewhere illustrated.

PLATE XVIII; Figures 155, b.

Fig. 155, Male, Mendocino County, Cal., June, 1893;
Author.b, Female, underside, Mendocino County, Cal., June,
1894; Author.

Quino is the largest, the most strikingly marked, and the least-known *Melitæa* of all the old species of California. Male, expanse two inches; brown-black on upper side, or, as Henry Edwards writes, "Black abounds, and overshadows both white and red; and Quino has all the markings of underside broadly and conspicuously edged with black." And Mr. Edwards, of all men, was best acquainted with Quino, and best able to describe it. Before Dr. Behr's death I applied three times to see Quino, without success, so that I concluded he had no Quino examples; and now that Dr. Behr is dead, his successors appear to be unable to identify Quino. The description of Quino is so brief and so indefinite that it is of but little value in a complex genus like *Melitæa*, so that the words above quoted are the best description extant of Quino. Students are referred to Papilio, 1881, p. 52.

156. *Melitæa Baroni*.

PLATE XVIII; Figures 156, b, c.

Fig. 156, Male, Mendocino County, Cal., June, 1891;

Author.

b, Male, Mendocino County, Cal., June, 1894;

Author.

c, Female, Mendocino County, Cal., June, 1878 (?) ;

O. T. Baron.

Size, 1.75 inches; above, black, not brown-black, all spots small; underside, intense reddish over the whole; the red color is not adequately represented on the plate; the black lines usually present are obsolescent, or mostly absent. Fig. 156 is one of the less red on upper side, and Fig. b is a redder example; the third, c, is a typical, given me about 1879, by Mr. Baron, who discovered the species and for whom it was named. In later years I have often visited the typical locality and have taken many fine examples. When fresh, the red color is peculiarly bright and intense, but unfortunately the red fades immediately, and after a while the color is not much different from the red of *Rubicunda*. In this statement as to fading I include the upper and under sides, but as the under side has much more red on it, the fading is more obvious there.

157. *Melitæa Chalcedon*.

PLATE XVIII; Figures 157, b.

Fig. 157, Male, Southern California, May, 1890; Author.

b, Female, underside, S. B. Mts., June 10, 1889;

Author.

In Southern California *Chalcedon* is the most common butterfly that waves its wings in the air. It flies in countless millions. It inhabits the plains, and the hills, and the mountain sides to an elevation of 5,000 feet, finding its larval food-plant wherever it goes. For the larvæ are feeders on the most common plants, that grow everywhere, namely, the *scrophulariaceæ*, which in some form or other grows universally. In Lower California I found the larvæ on a little wild rose, *R. minutifolia*, and I raised the larvæ to find what the species was that fed on rose. The larval habits vary with the environment; in the warm valleys, where there is but little winter weather, the larvæ are solitary, and hibernate without protection, but on the cold mountain heights

where snow and ice prevail for several months during the winter, the larvæ are gregarious, and hibernate in a web. The butterfly Chalcedon is perhaps the oldest of our butterflies, having been named in 1847, and has been illustrated several times in various works, and once, by mistake, doubtless, erroneously.

158. Melitæa Dwinelli. Not elsewhere illustrated.

PLATE XVIII; Figures 158, a, Males, S. Cal., May (?), June (?), 1885 (?); Author.

Dwinelli is a variety of Chalcedon in which the fore wings are suffused with red or yellow; I figure one example of each. The variety was first observed in 1881, in some specimens from the Mount Shasta region of Northern California, collected by Mr. Herman Dwinell, a young man of promise, who, unfortunately, soon died, leaving this name as his only monument. At that time the variety was found in both sexes, but I have never seen any but male specimens; though this is contrary to the ordinary happenings of such things, as usually the female sex is much more addicted to variations of all sorts than the males. The exact date of the capture of these specimens is uncertain, and is now merely guessed at. Three or four are all that I have ever taken, and all of them were taken in Riche Canyon, near Colton.

Fusimaculata is the name given by Dr. Barnes to a variety of Chalcedon, said to have come from California, but no data are given as to time or place. This variation is on the fore wings, where the three outer rows of spots are fused as if rubbed together in a horizontal way; no spots in cell; hind wings have long, rectangular yellow spots between the nerves. Beneath, the fusion is more marked than above; the basal spots are black instead of yellow.

Mariana is another name given by the same author to another variation of Chalcedon, and again, no data of time or place given. It is called a black Chalcedon, having only a marginal row of red spots. The description does not mention any yellow spots on fore wing, but notes a row of small mesial yellow spots on hind wing; apparently, therefore, it is almost wholly black, unless some yellow spottings are to be taken for granted.

159. Melitæa McGlashani.

PLATE XVIII; Figures 159, b, c.

Fig. 159, Male, Truckee, Cal., June 26, 1893; Author.

b, Female, Truckee, Cal., June 27, 1893; Author.

c, Female underside, Truckee, Cal., June 27, 1893;
Author.

McGlashani is a trifle more red on fore wings than Chalcodon, but the species might easily be mistaken for Chalcodon, as the system of markings is similar on each. These examples were taken by me in the typical locality of the species, which is quite local.

The larvæ feed on a species of pentstemon, a small plant less than a foot in height, and on which I have secured eggs in abundance, by confining the mature female in a small gauze bag, over the plant.

160. *Melitæa Olancha*, n. s. Not elsewhere illustrated.

PLATE XVIII; Figures 160, b.

Fig. 160, Male, Olancha Peak, Cal., August, 1891; F.
Stephens.

b, Female, underside, same place and same date.

Expanse, $1\frac{3}{4}$ to $1\frac{7}{8}$; black; red marginal lunules to all wings; large chalky-white spots, on the Chalcodon plan, with four red spots on the costal half of fore wing; hind wing has three rows of chalky-white spots; basal area very black, with three or four small white spots. Underside, all spots chalky-white, arranged as in Chalcodon, all, except at inner angle of fore wing, lightly outlined with black; on fore wing, between cell and apices, a large black oval transverse spot.

A high mountain species, the highest known to me, taken at about 11,000 feet elevation, on Olancha Peak, some thirty miles south of Mt. Whitney; a most difficult region; on the dividing line between the desert and the wooded, mountainous region of the crest of the Sierra Nevadas. Taken by Mr. Stephens, the California mammalogist and ornithologist.

161. *Melitæa Editha*.

PLATE XVIII, Figures 161, a, b.

Fig. 161, Male, Tahoe, Cal., no data; received from Prof.
J. J. Rivers.

a, Male, underside, Tahoe, Cal., no data; received
from Prof. J. J. Rivers.

b, Female, Tahoe, Cal., June 29, 1892; Author.

Editha and Rubicunda, the next species, are closely allied; the chief difference seems to be in the tint of the red color; Editha

spots are pale, or yellowish-red, and *Rubicunda* is a deeper, redder red. I have placed these allied species close together here for convenience of comparison, as always, through the book, wherever possible. *Editha* is smaller in size, and all the spots on upper side are relatively larger, so that *Rubicunda* has a darker appearance.

Editha ranges from Yosemite, north to the Oregon line, along the eastern base of the Sierra Nevadas. I have it from Madeleine Plains, in Northeastern California, taken by Mr. Stephens.

162. *Melitæa Rubicunda*.

PLATE XVIII; Figures 162, b, c.

Fig. 162, Male, Russian River Valley, Cal., June 10, 1894;
Author.

b, Female, Russian River Valley, Cal., June 10,
1894; Author.

c, Female, underside, Russian River Valley, Cal.,
June 10, 1894; Author.

The most common *Melitæa* of Northern California, flying in uncounted millions all over the northern parts of California, chiefly on the plains and hills, not so commonly on the higher mountains. Larger than *Editha*, and looks blacker because the red and yellow spots are smaller and do not cover so much of the black; and the red spots are of a deeper red color, as stated in *Editha*. *Rubicunda* is affected with the same variability as delineated in *Dwinelli*, where the fore wing is suffused with a brownish-yellow; I have specimens of this variation, but do not think them worthy of a place here, having already figured a similar suffusion.

163. *Melitæa Sierra*, n. s. Not elsewhere illustrated.

PLATE XVIII; Figures 163, b, c.

Fig. 163, Male, Sierra Nevadas, July, 1892; Author.

b, Female, Sierra Nevadas, July, 1892; Author.

c, Female, underside, Sierra Nevadas, July, 1892;
Author.

Size, large; expanse, $1\frac{3}{4}$ to 2 inches; very red in color, both wings nearly covered with pale red, and most of the buffy spots overwashed with the red, the female particularly being very red, even the base of hind wings is invaded with a large red spot, so

that it is half red. On underside, both wings are evenly covered with same tint of pale red, and all buffy spots faintly outlined with black.

This charming red beauty I found on the slope of the mountains, at an altitude of about 5,000 or 6,000 feet. It is apparently a member of the Editha group, with the same plan of markings, but two or three steps redder, being, in fact, the reddest large *Melitæa* that is known to me. It is rather active in flight for a *Melitæa*, and led the hunter a lively race. I have much pleasure in presenting these illustrations of this exquisite new species, and in introducing to the public this new and hitherto unknown member of the butterfly family.

164. *Melitæa Tylori*.

PLATE XVIII; Figures 164, b, Male and Female; Vanc. Island, July, 1890; Author.

This is a northern species, belonging to the *Rubicunda* group, but much smaller in size, and the red and buffy spots are much more sharply cut and distinct than *Rubicunda*, so that the colors look bright and contrasty. It is abundant in the Puget Sound country, on Vancouver Island, and on the mainland adjoining.

165. *Melitæa Anicia*. Not elsewhere illustrated in America.

PLATE XIX; Figure 165, Male; no data, from Colorado; T. L. Mead.

Anicia inhabits the Great Basin between the Rocky Mountains and the Sierra Nevadas, and in the more northern countries along the Canadian border it is said to come west into Washington and British Columbia, but I have never taken it myself in any part of the West Coast territory.

This species has several different forms, and to illustrate them I will figure four of the different varieties, those which are most likely to be met with in our West Coast mountains, namely, *Anicia*, *Wheeleri*, *Brucei*, and *Beani*. All of these forms are strictly mountain butterflies, with a high altitude habitat.

This figure of *Anicia* is a good illustration of the male; the female is larger and paler, as in all *Melitæas*. Although this is one of the very oldest species to become known, singular to say, it has not before this been illustrated in America.



166. *Melitæa Wheeleri*. Not illustrated elsewhere.

PLATE XIX; Fig. 166, Male, from Colorado; Dr. Barnes.

This has by one or two writers been classed as a variety of *Nubigena*, but it belongs here, as a variety of *Anicia*. It is peculiar in having a creamy base to the hind wings, this part being almost universally black in all butterflies, and this is about the only exception to the rule. *Wheeleri* may be looked for on the Sierra Nevadas, and any of the higher mountains of Oregon and Washington, and in the Yellowstone Park.

167. *Melitæa Brucei*. Not illustrated elsewhere.

PLATE XIX; Fig. 167, Female, Rocky Mountains of Colorado; D. Bruce.

This is another of the varieties of *Anicia*; it comes from the high mountains of Colorado, and is likely to be met with on the higher elevations of the Northwestern States, Wyoming, Idaho, Oregon and Washington. Little is known about it; indeed, I am not aware that any collector but Mr. Bruce ever took the variety; he first found it and it was named for him.

168. *Melitæa Beani*.

PLATE XIX; Figure 168, Rocky Mountains of Alberta; from Dr. Barnes.

This, the third and last variety that I shall illustrate of the different forms of *Anicia*, is found on the eastern slope of the Rocky Mountains along the line of the Canadian Pacific Railroad, well up on the alpine peaks. Found by, and named for, Mr. Bean, an official of the road in that region. It is very dark, as befits a cold mountain species. Presumably it will sooner or later be found on some of the mountains of the western slope, in British Columbia or Washington.

169. *Melitæa Augusta*.

PLATE XIX; Figures 169, b, c.

Fig. 169, Male, Potato Canyon, Cal., April 22, 1890;

Author.

b, Female, San Bernardino Mts., May, 1886;

Author.

c, Female, San Bernardino Mts., June, 1903;

Author.

Augusta is a local, southern *Melitæa*, and is known only from the southern counties of the State of California, and especially from the three counties of San Diego, Riverside, and San Bernardino, in which counties it is quite abundant in the proper season, particularly along the sea coast of San Diego County, and in the mountains of San Bernardino County. I believe it to be more abundant in the Mexican State of Baja California than in any place in the State of California.

There are three broods; an early one from chrysalides that have wintered over in the pupa state, and two later ones, the last one, in June, forming the chrysalides that will winter over for emergence in the early spring of the next year. The early brood is much smaller, and is markedly darker in color, especially on the fore wings, insomuch that at some future day it may be known by a separate name, as a seasonal form of *Augusta*; this early, dark form is not represented on the plate. In it, the black of fore wings is broadened or emphasized at the expense of the red and white.

This species was discovered by the Author in the foothills about San Bernardino, and in 1890 Mr. Edwards named it for Mrs. Wright, who had then passed on to the butterfly lands of the next world.

The larval food-plant, as ascertained by Mrs. Brandegee, of San Diego, is *Plantago patagonica*, a small, grass-like plant only two to four inches high. I have myself never been able to observe the ovipositing of the eggs or the feeding of the larvæ.

170. *Melitæa Augustina*, n. v. Not illustrated elsewhere.

PLATE XIX; Figures 170, a, S. B. Mts., April, 1891;
Author.

Augustina was taken with *Augusta* at a time and place when there were no other *Melitæas* in flight, and undoubtedly it is a variety or aberration of *Augusta*. As the specimen is unique, I had to detach the left wings in order to show the underside; the photographic figure shows a very singular plan of markings, unlike anything I have ever seen elsewhere. The example is male; and males are seldom liable to aberration or variation, but it has the appearance of an aberration, being almost too extreme for a merely variant form. I have named it "the little *Augusta*."

171. *Melitæa Nubigena*.

PLATE XIX; Figures 171, a.

Fig. 171, Male, Colorado, no data; received from D. Bruce.

a, Male, underside, no data; received from D. Bruce.

Nubigena is a mountain butterfly, inhabiting the Rocky Mountains and the mountains of the Great Basin, in Utah, Nevada, and all the States to the north, and the southern provinces of Canada. I do not know that it has ever been taken in any of the West Coast States proper, but it is very probable that it may be found in the mountains of Idaho and of Eastern Oregon and Washington.

V. Capella, Barnes, a variety of *Nubigena*, occurring in Colorado, has been named *Capella*, but I know nothing of it. Presumably it is a local form, not coming to the West Coast region.

172. *Melitæa Helvia*.

No figure.

Helvia was taken at Ramparts, on the Yukon River, probably in the year 1868; the collector's name is unknown to me; but one specimen was taken, and that one is supposed to have been lost in the great fire at Chicago, so as it never was figured, it is lost completely. For, in a complex genus like *Melitæa* a description in words only will scarcely suffice to hold the name.

173. *Melitæa Sterope*.

No figure.

"Size, 1.80 to 1.90. Blackish-brown above, with light markings. Beneath, hind wings, marginal crescents with edging of black on both sides, and within this row is a black band that contains a series of yellowish dots, each white-pupilled; base, yellowish, with six white spots." As this is a species quite unknown to me, I have given the main points of the description. I have hunted butterflies in Oregon a good deal, but I never happened to meet this butterfly. It has never been figured.

174. *Melitæa Gabbi*.

PLATE XIX; Figures 174, b, c.

Fig. 174, Male, Southern California, 1885; Author.

b, Female, Southern California, 1899; Author.

c, Female, underside, Southern California, 1903; Author.

Gabbi is a southern species, being found in southern California and in the southern parts of Nevada, and Utah, and in Arizona. It is the first one of the three "pearly spots," the light spots on the underside of hind wing being so lustrous that they might almost be called silver. This pearly luster is not properly shown on the plate, as it is one of those things that cannot be caught by the photographic process.

Gabbi is an early spring bird, very slow and gentle in flight, and stopping often to rest, alighting on the ground and waving its wings wide open, as if enjoying itself greatly. It frequents the foothills and the lower canyons and open valleys, but is never seen on the hilltops or in exposed places.

175. *Melitæa Acastus*.

PLATE XIX; Figures 175, b, c.

Fig. 175, Male, Pasco, Eastern Washington, July, 1891;
Author.

b, Female, Pasco, Eastern Washington, July, 1891;
Author.

c, Female, underside, Pasco, Eastern Washington,
July, 1891; Author.

This species is of more northern habitat than Gabbi; it is not seen south of the Tehachapi Mountains. I have taken it on the Tehachapi, and the Greenhorns, and thence northward to the plains of Eastern Washington; and as the conditions hold good, it is likely to go far north into the provinces of Canada at the eastern base of the Rocky Mountains.

176. *Melitæa Palla*.

PLATE XIX; Figures 176, b, c.

Fig. 176, Male, Sierra Nevadas of Central California, July,
1892; Author.

b, Female, Summit, Cal., June 30, 1892; Author.

c, Female, underside, Summit, Cal., June 30, 1892;
Author.

Palla is a still more northern species than the last; it flies from the mountains of Central California through all the intermediate countries to Alaska at St. Michaels. The spots of underside are less pearly than the two preceding species. It is altogether a mountain flyer and is not seen in the plains and valleys of the States, but, of course, it flies on the plains at the far north.



177. *Melitæa Whitneyi*.

PLATE XIX; Figures 177, b, c.

Fig. 177, Male, Summit, Cal., June 28, 1892; Author.

b, Female, Summit, Cal., June 28, 1892; Author.

c, Female, underside, Summit, Cal., June 28, 1892;
Author.

This is a mountain butterfly like the two preceding, but its range is quite limited as compared with those two; it is common about Lake Tahoe, and it comes as far south as the Greenhorn Mountains, and it is also common in Nevada, or at least, that part of Nevada that lies next to California; it is not known far to the east of the Sierra Nevada range of mountains.

178. *Melitæa Eremita*, n. s. Not illustrated elsewhere.

PLATE XIX; Figures 178, b, c.

Fig. 178, Male, Central California, June, 1894; Author.

b, Female, Central California, June, 1894; Author.

c, Female, underside, Central California, June,
1894; Author.

Expanse, 1.60 to 1.85; ground-color, brownish-black; a thin marginal line of red spots, and a sub-marginal line of small orange angled or lunular spots across both wings, an inner line or row across both wings of yellow or red; discal band of yellowish oval spots; base, black with obsolescent spots. Beneath, fore wing marked after the pattern of *Whitneyi*, but clearer and with more black, the hind wing after the pattern of *Whitneyi*, and with the row of red spots outside the mesial band ocellated with yellow.

This fine new species was taken by me in a hilly region in Central California. These two examples are all that were taken, perhaps because at the time I did not realize the value of the prize that had fallen to my net. The right-hand wings of the female were broken off to show the underside, as I have no other specimen. I have named it *The Hermit* because it kept itself hidden so long, in a favorite butterfly hunting ground.

179. *Melitæa Hermosa*, n. s. Not elsewhere illustrated.

PLATE XIX; Figures 179, b, c.

Fig. 179, Male, Southern Arizona, July, 1891; Author.

b, Female, Southern Arizona, June, 1889; Author.

c, Male, underside, Southern Arizona, June, 1889;
Author.

Expanse, 1.60 to 1.80. Both wings salmon-red color, with markings of black and of pale buff, and in the male, of white. Margins reddish; the male has two sub-marginal rows of white spots on a black ground on fore wing, with several costal and cellular white spots, and all the other spots are salmon or flesh-color. The female has no white spots, all the spots on the female, and on hind wing of male, are pale flesh or buffy. Beneath, the spots of the male are white, with black lines, on a reddish ground.

This elegant new species was taken by the Author in Southern Arizona, as noted above, and these three, together with three other males, have stood in my cabinet all these years, labeled, "n. s., undescribed," patiently awaiting this opportunity of displaying their beauties to the world. The colors of the ornamentation are different from any other *Melitæa*; the red is paled to salmon or flesh color, and the yellow to nearly white. It is indeed a peculiar thing, and one that only Arizona could furnish.

The name *Hermosa* is used as signifying handsome or beautiful, for as I look at butterflies, this is the most exquisite *Melitæa* that flies in America today.

180. *Melitæa Colonia*, n. s. Not elsewhere illustrated.

PLATE XX; Figures 180, a, b.

Fig. 180, Male, Mt. Hood, Oregon, August, 1891; Author.

a, Male, underside, Mt. Hood, Oregon, August, 1891; Author.

b, Female, Mt. Hood, Oregon, August, 1891; Author.

Expanse, 1.50 to 1.55; ground color, black; a marginal series of red lunules on both wings, confluent in the female; a sub-marginal line of buff-and-red linear dots across fore wings; an inner sub-marginal row of buff spots across both wings; inside, another row of red spots; followed by the discal series of buff, and the red and buff spots in the black base. Beneath, fore wings reddish, with buff spots, not obsolete at base; on hind wings the outer series of buff spots is immediately followed by a red series, confluent, forming a red band, and moreover, on upper side of female hind wings, as well as on both sexes beneath, this red band reaches inward and covers a third part of the usual mesial band of buff spots, a peculiar feature, and not seen in any other *Melitæa* known to me.

The types of Colon and this species being from the same place, I have named this smaller and more beautiful one The Little Sister of Colon. Only these two figured examples were taken; therefore, to show the peculiar overflow of the red over the buff, I had to detach the left-hand wings of the male, for use on this plate.

181. *Melitæa Sabina*, n. s. Never before figured.

PLATE XX; Figure 181, Female, Catalina Mountains; Arizona; Carpenter.

Expanse, 1.65; all wings pale reddish, broadly spotted with large buffy-red spots, after the pattern of Palla, which seems to be its closest relative. Beneath, the spots on hind wing are pearly-white, like all the species of the Palla group.

This example was taken in the Catalina Mountains of Southern Arizona, by Mr. Carpenter, the exact date unknown, and sent to me by W. H. Edwards, in 1889, with the injunction to "look it up and publish it, as it is certainly a new species." It is a very old and worn specimen, and for years I hoped to get others like it, but it has remained all these years in my cabinet, alone, as I have never seen another like it. The ornamentation is peculiar.

I have named it Sabina, after the canyon where it was taken, in the Catalina Mountains.

182. *Melitæa Hoffmanni*.

PLATE XX; Figures 182, b, c.

Fig. 182, Male, Sierra Nevadas of California, July, 1892; Author.

b, Female, Sierra Nevadas of California, July, 1892; Author.

c, Female, underside, Sierra Nevadas of California, July, 1892; Author.

Hoffmanni is a mountain species, frequenting the little valleys about the high mountains. It is said to be found in the mountains of nearly all the States of the Great Basin, between the Sierra Nevadas and the Rocky Mountains. It is the mountebank among butterflies, as it has all sorts of disguises and masks, showing many strange variations and aberrations, two of which are depicted here following.

183. *Melitæa Abnorma*, n. v. Not elsewhere figured.

PLATE XX; Figure 183, Female; b, same, underside,
Truckee, Cal., June, 1893; Author.

This is doubtless an aberration or extraordinary form of the preceding, *Hoffmanni*, as it seems to bear the hall-mark of that species, but it was found in a different habitat, as I have never taken any *Hoffmanni* at this particular locality.

184. *Melitæa Mirabilis*, n. v. Not illustrated elsewhere.

PLATE XX; Figures 184, Female; b, same, underside,
Lake County, Cal., May, 1894; Author.

This marvelous thing is perhaps another and an extreme aberration of *Hoffmanni*, though the locality of capture is some two hundred miles away from any known habitat of *Hoffmanni*; still, as in the preceding figure, it seems to bear the face of a *Hoffmanni*, and so I consider it an aberration of that species.

185. *Melitæa Cyneas*. Not elsewhere illustrated.

PLATE XX; Figure 185, Female, Huachuca Mts. of Arizona; Dr. Barnes.

This is properly a Mexican species, as it only enters American territory a little at the southern boundary of Arizona.

186. *Melitæa Leona*, n. v. Not elsewhere illustrated.

PLATE XX; Figures 186, b.

Fig. 186, Female, San Rafael, Cal., June, 1894; Author.

b, Female, underside, San Rafael, Cal., June, 1894;
Author.

Expanse, 1.90: The general appearance of the upper side is that of a melanic *Leanira*, the buff spots on fore wing smaller, and on hind wings obsolete or wanting; on underside the yellowish spots are quite unlike, as the curved row of six round spots is absent altogether.

Leona appears to be a variety of *Leanira*, was taken in the territory of *Leanira*, incidentally, by the roadside, while passing through the country on a camping butterfly hunt, in fact, was supposed to be a *Leanira* until it was examined, later, at camp. The example is unique, and, as in several other cases, one pair of wings had to be detached in order to show the underside, because in this butterfly, as in most instances, the marked variation is on the underside.

187. *Melitæa Leanira*. Not correctly illustrated elsewhere.

PLATE XX; Figures 187, b, c.

Fig. 187, Male, no data, unknown collector.

b, Female, Northern California, 1880? O. T. Baron.

c, Female, underside, Lake County, Cal., June, 1892; Author.

This figure of the male was obtained by me from an unknown collector at San Francisco, and is given here because of its small size, it being the smallest I have seen; the figures of the females are of large sized examples, showing a wide variation. *Leanira* flies in Northern California, and is the most northern member of this group. It is rather solitary in habit, and is never found commonly or in numbers, as many kinds are; this feature holds good also with the other members of this group, that they are scattering, and nowhere abundant.

The group consists of *Leanira*, *Wrighti*, *Cerrita*, *Alma*. *Cyneas* should be included if it were an American species; also the varieties *Leona*, previously illustrated, and *Obsoleta*, from the Rocky Mountains.

188. *Melitæa Wrighti*.

PLATE XX; Figures 188, b, c.

Fig. 188, Male, Little Mountain, So. Cal., March 25, 1895;
Author.

b, Female, Riche Canyon, April 10, 1882; Author.

c, Female, underside, Foothills, S. B. Mountains,
1885; Author.

This is the Southern California representative of this group, being more abundant here than elsewhere, and not extending far from this particular region. It flies in spring and summer, but is not seen on the wing in the later months. Not common anywhere, and only occasionally taken under the best circumstances.

189. *Melitæa Cerrita*, n. s. Not elsewhere illustrated.

PLATE XX; Figures 189, a, b.

Fig. 189, Male, Southern California, May 19, 1896;
Author.a, Male, underside, Southern California, May 19,
1896; Author.b, Female, Southern California, May 19, 1896;
Author.

Expanse, 1.20 to 1.50: Orange ground, paler in the male, with indefinite blackish markings after the pattern of *Wrighti*, and with whitish spots; veins bordered blackish, heavily so in the female. Beneath, fore wing is paler orange, spots light, obsolete; hind wing, white ground with scattering scales of brown; black band near base, as in *Wrighti*, enclosing a sub-quadrangular white spot; a narrow, blackish, mesial band enclosing six sub-quadrangular white spots.

This seems to be the southern, sub-tropical member of this group, and is allied to *Alma*, being redder, spots more obsolescent, white, not yellow, basal area not yellow, and all black markings indefinite.

The pair of examples here figured are uniques; they were taken while I was hunting for *Wrighti*, and in company with that species.

190. *Melitæa Alma*.

No figure.

Only one male and one female known, one of them from Northern Arizona and the other from Southern Utah. The male is figured in Strecker's *Rho.-Het.*, Plate XV, 1876. According to those figures *Alma* is patterned similar to *Cerrita*; the upper side is orange, with lighter, yellow spots, sharp edged black markings, base black and bright yellow; on underside the fore wing is colored same as the upper side, with heavy yellow and black markings about same as on upper side, and very much heavier than on *Cerrita*; the hind wing is light-yellow, not white, like *Cerrita*; the base is clear yellow, without the sub-basal band of black, or any spots or markings whatever similar to the black on *Cerrita*.

191. *Melitæa Nympha*.

PLATE XX; Figure 191.

Fig. 191, Male, Southern Arizona; H. K. Morrison, 1880?

Nympha is properly a Mexican species, coming into American territory only along the Southern Arizona border.

192. *Melitæa Bolli*.

PLATE XX; Figure 192.

Fig. 192, Male, Southern Arizona, 1880? H. K. Morrison.

This little *Melitæa* flies in Arizona and Texas. I have never seen it in flight; this example was sent to me by that reliable col-



lector, Mr. Morrison, under this name of Bolli, but I believe that it is the same as the next species, Thekla; if so, as Thekla was named seven years earlier than Bolli, the latter name must be dropped.

193. *Melitæa Thekla*.

PLATE XX; Figure 193.

Fig. 193, Southeastern Arizona, 1880 (?) ; H. K. Morrison.

From the same locality, and evidently the same species as the preceding. This is, I think, a female, and evidently makes a good pair, so that I should say the name Bolli should be merged into Thekla. I have retained both names because all the catalogues contain both, and I am seeking to depict things as I find them.

194. *Melitæa Minuta*.

PLATE XX; Figures 194, b, c.

Fig. 194, Male, Southern Arizona, 1880? H. K. Morrison.

b, Female, Southern Arizona, 1880? H. K. Morrison.

c, Female, underside, Southern Arizona, 1880? H. K. Morrison.

This is another species from the southern part of the Great Basin country, where so many species are found that more properly belong in Mexico. *Minuta* is said to fly to Colorado, and New Mexico.

195. *Melitæa Chara*.

PLATE XX; Figures 195, b.

Fig. 195, Male, Colorado Desert, April, 1891; Author.

b, Female, Colorado Desert, April, 1891; Author.

The word *chara* signifies "joy"; this charming little butterfly is, therefore, appropriately named. *Chara* lives in semi-desert places, or, perhaps, it would be more correct to say that it lives in little fertile nooks and bye-places which are surrounded by deserts and desert mountains, in Southeastern California, Nevada, Utah, Colorado and Arizona. The pattern of ornamentation is very similar to that of *Minuta*, though the butterfly is of much smaller size.

The larval food-plant of *Chara* is *Beleperone Californica*, a bush three to five feet high, and bearing showy red flowers; the flowers are used as a dye by the Indians.

196. *Melitæa* Perse.

PLATE XX; Figure 196.

Fig. 196, Male, Southern Arizona, 1880? H. K. Morrison.

This is another, and the last, of those Mexican species that sometimes come over the border into America, and are found along the line in Arizona.

Genus PHYCIODES.

This genus is similar to the *Melitæa*, and at one time the *Phyciodes* were classed in with the *Melitæas*. The *Phyciodes* are all of them about the same size, none very small nor any large, and all look much alike, as you see by Plate XXI.

All the species are fond of feeding on flowers. They are of gentle flight, stopping often to rest. When resting on the ground or on twigs they have a habit of holding their wings out flat and waving them up and down, as if fanning themselves.

Nearly all of the species are valley and foothill inhabitants, only one of them going up into the mountains to any great height.

The sexes are so dissimilar that the ornamentation affords usually sufficient identification; the more technical points are similar to the *Melitæa* genus.

The food-plants are not very well understood, and are noted in the species paragraphs, wherever known, as the known plants are of widely separated genera, in which point the *Phyciodes* are somewhat out of the ordinary, as they should apparently use plants of a particular order, as do the *Melitæas*. But their ways are not as the *Melitæas'* ways.

197. *Phyciodes* | *Nycteis*.

PLATE XXI; Figure 197.

Fig. 197, Male, underside, Minnesota, 1880; H. Strecker.

The figure is a male of the eastern species *Nycteis*, that flies from New England to Maryland, and west to the Rocky Mountains, not being known to the westward of that range. It is shown here to show the difference between it and the Western form taken by me at Pasco, Eastern Washington; this latter being shown at Fig. *a*, following.

198. *Phyciodes Pascoensis*, n. s. Not elsewhere illustrated.

PLATE XXI; Figures 198, a.

Fig. 198, Male, May 10, 1890; Author.

a, Male, underside, May 10, 1890; Author.

Pascoensis is the Western *Nycteis*. The upperside is very similar to *Nycteis*, being a little less dark, as the black markings are less broad. On the underside the dark markings and clouds are obsolescent and faint, and much less obvious than in *Nycteis*, as is well shown on the plate.

The female of *Nycteis* is much larger than the male, and is also differently and more strikingly marked, insomuch that it looks like another species; so, when the female of *Pascoensis* is found it will probably be much larger than this figure of *Pascoensis*, much handsomer, and so different that you may think it another and larger species; but at present the female of *Pascoensis* is not known.

Pascoensis will be found over all the interior, semi-arid region of Eastern Washington and Oregon and Idaho.

Food-plant: *Actinomeris*, probably.

199. *Phyciodes* (*Tharos*).

PLATE XXI; Figures 199, a.

Fig. 199, Male, Southern Arizona, 1885; Author.

a, Male, underside, Lower California, 1896; F. Stephens.

Tharos is considered an eastern species, but of late, say since 1892, it has become common, or at least, occasional, all over Arizona and Southern California. I have specimens from Northern and Southern Arizona, Yuma, the Mexican State of Baja California, at the head of the Gulf of California, and as far north as Santa Barbara; none of them differ from the eastern species. This fact establishes the point that a species can be the same, east and west; therefore, when forms do differ, they should be recognized as different, and have separate names, as in the case of the preceding, *Nycteis* and *Pascoensis*.

Food-plant: *Actinomeris helianthoides*.

200. *Phyciodes* (*Marcia*).

PLATE XXI; Figures 200, b, c.

Fig. 200, Male, San Bernardino, Cal., October, 1894;

Author.

b, Female, San Bernardino, Cal., October, 1896;
Author.

c, Female, underside, San Bernardino, Cal., October, 1896; Author.

This species, like the preceding, *Tharos*, used to be thought an Eastern species, but it is now found over the same territory as is *Tharos*. *Marcia* was once called the winter form of *Tharos*, but on this Coast they both appear at all times of the season, so that the old theory of seasonal forms does not hold good; and I see no reason why the one is not just as good a species as the other. Certainly, neither form is a seasonal variety of the other, here on the West Coast.

201. *Phyciodes Pratensis*.

PLATE XXI; Figures 201, b, c.

Fig. 201, Male, Lake County, Cal., June, 1894; Author.

b, Female, Oregon, 1892; Author.

c, Female, underside, Helena, Mont., June, 1891;
Author.

Pratensis is a widely-diffused species, of rather northern habitat, as it never comes south of the latitude of San Francisco, so far as I know, although it is credited to Arizona, but erroneously, I think. At one time *Pratensis* stood for a good part of all the varied species of *Phyciodes* on the West Coast, and any new form was set down as "one of the endless varieties of *Pratensis*," by a certain learned gentleman of the East, who could not believe that there was room for more than one species, in all this vast Western country.

202. *Phyciodes Orseis*.

PLATE XXI; Figures 202, b, c.

Fig. 202, Male, Ellensburg, Wash., May, 1890; Author.

b, Female, Tehachapi Mountains, So. Cal., 1892;
Author.

c, Female, underside, Ellensburg, Wash., May,
1890; Author.

Orseis enjoys a vast range. It is a mountain form in the southern part of its range, as in the Tehachapi Mountains, and in Arizona and Mexico, but it inhabits the plains and lowlands in the more northern countries. It has the same type of markings as *Pratensis*, but is much darker on the upper side; and much lighter

on the underside, being a smooth, pale yellow beneath. Some writers have theorized that Orseis was a mountain form of Pratenis, but Orseis flies a thousand miles south of any locality of Pratenis.

203. Phyciodes Camillus.

PLATE XXI; Figures 203, b, c.

Fig. 203, Male, Pendleton, Oregon, July, 1890; Author.

b, Female, Colorado, no data, 1886? Nash.

c, Female, underside, Tucson, Arizona, June, 1893;
F. Stephens.

This common species covers the whole country west of the Rocky Mountains, from Mexico to Canada, with a probable overflow to the north and to the south, with the exception that it is not found on the immediate Coast near the Pacific Ocean. Like most wide-spread species, examples from widely separated localities vary somewhat, but on the whole, it is quite constant and uniform in its appearance.

Food-plant: Aster, various species.

204. Phyciodes Mylitta.

PLATE XXI; Figures 204, b, c.

Fig. 204, Male, Portland, Oregon, June, 1891; Author.

b, Female, San Bernardino, Cal., May, 1897;
Author.

c, Female, underside, San Bernardino, Cal., June,
1899; Author.

Mylitta resembles the preceding in a good degree, but is much lighter having fewer dark spots, and the ornamentation is inclined to be indistinct or obsolescent. The range of Mylitta is about the same as that of Camillus; I have taken it near the Mexican line on the south and at Puget Sound at the north, and in Montana; and it goes eastward to Colorado. It differs from Camillus in that it flies to the edge of the sea, and does not go far up into the mountains, even at the south.

Food-plant: Carduus, thistles.

204a. Phyciodes Barnesi.

PLATE XXI; Figures 204a, aa.

Fig. 204a, aa, Colorado, no data, from Dr. Barnes.

In Colorado is found "a large, pale, Mylitta," that is named

for Dr. Barnes. It is called a variety of *Mylitta*, but I think it will yet be recognized as a species. It is not known to the westward of Colorado, at present, but it is likely to be found up to the eastern base of the Sierra Nevadas, and, therefore, I give it place here. It will some day be found in Eastern Oregon and Washington.

205. *Phyciodes Montana*.

PLATE XXI; Figures 205, b, c.

Fig. 205, Male, Sierra Nevada Heights, 7,000 feet, 1892; Author.

b, Female, Sierra Nevada Heights, 7,000 feet, 1892; Author.

c, Female, underside, Sierra Nevada Heights, 7,000 feet, 1892; Author.

This, of all *Phyciodes*, is the high mountain species, not flying at a less elevation than 6,000 feet, and from that up to 9,000 feet. It is mostly found on the Sierra Nevadas of California; I have never taken it on any other mountains, though there is no visible reason why it should not be taken in Oregon and Washington.

206. *Phyciodes Picta*.

PLATE XXI; Figures 206, b, c.

Fig. 206, Male, Santa Rita Mountains, Arizona, July, 1892; F. Stephens.

b, Female, Greaterville, Arizona, June, 1885; Author.

c, Female, underside, Santa Rita Mountains, July, 1892; Stephens.

Picta is a species belonging to the Middle West, being found in Nebraska, and thence south through the Rocky Mountain region to the Santa Ritas of Southern Arizona, which is, so far as I know, the most western locality, the only point upon the Western slope inhabited by this butterfly.

Genus *ERESIA*.

Only one species of *Eresia* is found on the West Coast; and that one is found only in Arizona along the Mexican line, at Yuma and other points on the Lower Colorado River.

207. Eresia Texana.

PLATE XXI; Figure 207.

Fig. 207, Male, Phoenix, Arizona, July, 1885; Author.

This species is abundant in Southern Arizona, which locality is its most northern point. It is of gentle flight, and easily caught. It has but small interest for West Coast people. I have found it very common at Mazatlan, in the winter.

Genus SYNCHLOE.

All are medium sized butterflies; of black or orange colors. Most Synchloes are of semi-tropical habitat; nearly all American species are from Texas, and only one comes west as far as California, so that the list for the West Coast is a short one, and Synchloe has but little interest for the butterfly hunter of the West Coast.

The sex-marks are as in *Melitæa*.

Food-plant of all the species is *Helianthus*, the common sunflower.

208. Synchloe Lacinia.

PLATE XXI; Figure 208.

Fig. 208, Male, Southern Arizona, June, 1885; Author.

This butterfly is credited with being the most variable species in America, being very inconstant, and showing all possible variations. The forms figured here and numbered 208, 209, 210, and 211, are supposed to be really but varying forms of one species only; I cannot say that the three higher numbers are forms of the first, for that first one may be as properly called a form of some one of the others. But each form can and should have a name of its own, whether it may be closely or but remotely related to some other.

209. Synchloe Crocale.

PLATE XXI; Figure 209.

Fig. 209, Male, Phoenix, Arizona, 1885; Author.

This is the best known and representative form of the Arizona species of Synchloe. It is very abundant among the jungles of the sunflower about Phoenix, and can be caught in any quantity. You will get there all of these three forms, this and the two fol-

lowing, and you will scarcely find half a dozen examples alike, but each runs into the other, as is the case with variant forms everywhere.

210. *Synchlœ Rufescens.*

PLATE XXI; Figure 210.

Fig. 210, Male, Phoenix, Arizona, June, 1885; Author.

This name is published as the name of the form with small orange spots on both wings, the small outer points being white. The figure here is an average one; and of course there are many examples that will be difficult to assign to either name; that is to be expected in all cases.

211. *Synchlœ Nigrescens.*

PLATE XXI; Figure 211.

Fig. 211, Female, Phoenix, Arizona, June, 1885; Author.

This name is given to those specimens that are nearly devoid of spots of any color, especially on the hind wing, so that the whole surface is nearly black. I have never seen a *Crocale* that did not show more or less spots; this figured example is a good sample of those that are as black as can well be found.

212. *Synchlœ Californica*, n. s. Never before illustrated.

PLATE XXI; Figures 212, a, b, bb, c.

Fig. 212, Light colored Male, Colorado Desert, April 2, 1892; Author.

a, Dark colored Male, Colorado Desert, 1893; F. Stephens.

b, Light Female, Colorado Desert, April, 1890; Author.

bb, Dark Female, Colorado Desert, April, 1895; Author.

c, Female, underside, Colorado Desert, April, 1895; Author.

Expanse, 1.40 to 1.70: Color, yellowish-orange on both wings; brownish black at base to costa, with variable yellowish spots; a blackish sub-marginal band across both wings, containing six or seven whitish dots on each wing; a yellowish maculate marginal band around both wings, cut by the nervures. Beneath, similar to upperside.

This is a new species, discovered by the Author nearly fifteen years ago, and now first published and figured, as it has been held



in abeyance awaiting the publication of this book. This new species is very different from any other known *Synchlœ*; and it is a departure from the Arizona tangle of the species of the intergrading, *Crocale* type, for it is quite true and constant, not differing essentially at any point; in fact, these examples here figured are the extreme forms, illustrated to show the outside variations.

It is, so far as now known, an exclusively Californian species, not having been taken in Arizona, or any other State, nor in Mexico.

The food-plant has not been positively determined, but presumably it is *helianthus*.

Genus GRAPTA.

All Graptas that are found in Western America are very similar in size and in appearance on the upper side, insomuch that frequently you can scarcely tell a species by the upper side alone; but by the underside the determination is chiefly to be made. No small sized Graptas are known anywhere. All Graptas are noted for the deeply-excavated margin of both wings, and by the silver crescent or comma, as it is called, in the center of hind wing on under side. All Graptas are noted for being always constant and true, any variation or aberration being unknown. The shape and size of the silver crescent is constant in each species, but each differs from every other species in that peculiar mark, so that it affords a good pointer as to what species the specimen belongs to.

Western Graptas are found in places that are more or less forested, in canyons, on hill sides, among scattered trees, and in willow copses; never out on the open plain, or on exposed places. Graptas frequently live through the winter, by hiding away in sheltered places.

The West Coast Graptas appear to go in pairs of species, or that two similar species of each type are found, these two closely resembling each other, and being widely different from any others; as *Satyrus-Marsyas*; *Faunus-Rusticus*; *Zephyrus-Gracilis*; *Silenus-Oreas*; and only the new species *Chrysoptera*, stands alone.

The sexes are much alike, and often difficult to determine; the females are larger, and paler, and the abdomens are larger; and the matter can be determined best by comparison of these features.

The larval food-plant of all Graptas is nettles.

213. Grapta Satyrus.

PLATE XXII; Figures 213, a.

Fig. 213, Male, Southern California, 1889; Author.

a, Female, underside, Central California, 1894;
Author.

Satyrus is very wide-spread, covering most of temperate America except the Southern Atlantic States; and on the West Coast it flies from Mexico to far north into British Columbia. The underside is beautifully marked in various shades of brown, heightened by yellowish lines. Satyrus flies nearly the whole year around.

The larval food-plant is nettles.

214. Grapta Marsyas.

PLATE XXII; Figure 214.

Fig. 214, Female, underside, Vancouver Island, July, 1891; Author.

It is a theory with some that Marsyas is a cold weather form or variety of Satyrus, being a little darker both above and beneath than Satyrus, but I do not believe such to be the fact; and you can see for yourself by the plate that the darker form is a summer brood. So I conclude that in this country, at any rate, there are two constant forms, and that they neither of them pay much attention to the weather; that, in fact, they both are good and separate species. If they were not, they would soon become homogeneous and indistinguishable.

215. Grapta Faunus.

PLATE XXII; Figure 215.

Fig. 215, Male, near Mullan Pass, May, 1892; Author.

Faunus is one of the darker-colored Graptas, and its wings are extremely angular and with many bold projections. This, and the next are closely allied, they seem like brothers.

Faunus flies in New England, and through the Northern Middle States, and to the Pacific Coast at Puget Sound, and thence north to St. Michaels in Alaska. I have found this species to be quite rare, in all the places where I have found it.

The underside of hind wings is highly variegated, the lighter outer parts contrasting sharply with the darker base, and with small spots of green near margin, and it is in this point that one difference between it and the next species, lies.

216. Grapta Rusticus.

PLATE XXII; Figure 216.

Fig. 216, Female, underside, Portland, Oregon, May, 1892; Author.

The upper side of Rusticus is very similar to Faunus; the underside is less variegated than Faunus, with less light color on the outer part of margin of the wing, and less contrasty.

This butterfly is very rare, and I have found it a difficult one to capture, when at length one is discovered.

217. Grapta Silvius.

No figure.

Silvius was named from one example, bred from the larva of Rusticus, and was supposed to be an aberrant form, and not a distinct species, and never should have been put in the catalogues as a species. It is scarcely necessary to speak at length on such a specimen, and it is only mentioned here to account for the name as it appears in the catalogues. Students will find the text, what little there is of it, in Edwards' Butt. N. A., 2, VIII, 1879, after text of Rusticus.

218. Grapta Zephyrus.

PLATE XXII; Figure 218.

Fig. 218, Female, underside, Truckee, Cal., July 1, 1893; Author.

Zephyrus and the following, Gracilis, are similar in many aspects, and they are put side by side here for the comparison of the main points of difference, which you will find on the under side, as figured on the plate. There is no appreciable difference on the upper side.

219. Grapta Gracilis.

PLATE XXII; Figure 219.

Fig. 219, Female, underside, Tacoma, June, 1889; Author.

Gracilis has the underside of a bluish tint, and the silver C is larger than in Zephyrus. The wings of Gracilis appear more deeply concaved than Zephyrus, but the two forms are very much

alike, in fact, the general tint of underside is the strongest feature of difference between the species, and probably that will fail you when you come to assort and identify your specimens, and there will be some which you cannot assign with confidence.

220. *Grapta Silenus*.

PLATE XXII; Figures 220, a.

Fig. 220, Female, Tacoma, Wash., June, 1890; Author.

a, Female, underside, Portland, Oregon, June, 1890; Author.

This is a dark, Northern butterfly, dark on upper side, and almost black on the underside. It is found in Oregon and Washington. It frequents partially forested hillsides, and other scantily wooded places. This Figure 220 a, was taken on Mt. Tabor, at that time a wooded highland, where I found fine butterfly hunting; but I hear that in later years the whole hilltop is cleared off and that fine dwellings have been built there, so, of course, the butterfly ground is spoiled.

221. *Grapta Oreas*.

PLATE XXII; Figure 221.

Fig. 221, Male, underside, Mt. Shasta, 1890; Author.

As compared with *Silenus*, the colors are smoother and less variegated, and the tint of underside is brownish-black against the blacker black of *Silenus*, and the silver C is smaller, and less conspicuous. *Oreas* I have found to be rare, and in twenty years I have taken but two examples, and these two were on high mountains where one is not expected to go very often. I suppose that *Oreas* may be called the high mountain or more northern *Grapta* of the Coast.

222. *Grapta Chrysoptera*, n. s. Not illustrated elsewhere.

PLATE XXII; Figures 222, b, c.

Fig. 222, Male, Lake County, Cal., June, 1894; Author.

b, Female, Lake County, Cal., June, 1894; Author.

c, Female, underside, Mendocino County, Cal., June, 1894; Author.

Expanse, 2. to 2.50: Generally golden color; the fore wings of male redder, with dark margin of medium width; the male

hind wings and both wings of the female are concolorous, and the dark margins are obsolescent, or in part wanting altogether; the usual light sub-marginal spots are but faintly indicated. Underside, golden color, the male a little darker than the female; border faint, wholly wanting at apices and inner angles, no border on hind wings; the whole underside delicately penciled in light brown, the basal part but slightly darker than the marginal; the silver C is long, slender, curved, barbed at both ends, but in the type of the male the barbs are wanting.

This is the largest *Grapta* in California, or on the West Coast, and the lightest in color, well deserving the name, "Golden-wing." It is a lowland species, flying on the hills and in the valleys, but not on the mountains, nor on the wide plains.

Genus VANESSA.

This is a genus of five species; all of them are short-bodied and broad-winged butterflies, of extremely strong and rapid flight. Some of the species are world-wide in flight, and all of them, except *Californica*, are well-nigh continental in range.

The various species have different food-plants.

223. *Vanessa Antiopa*.

PLATE XXII; Figure 223.

Fig. 223, Male, Southern California, 1886; Author.

This is a very common and a world-wide species, well known to every one who is at all acquainted with butterflies. The female is very much like the male, a little larger, and the blue spots are larger and more of them, on both wings.

Food-plants are the leaves of willow and cottonwood trees, but the willow is preferred.

There is a variety or an aberration in the East that has the golden band wider, and extending inward over the space usually occupied by the blue spots, the blue spots being absent in that case. This variety has not been named.

Hippolyta. In Canada there is another variety, or aberration, in the female only, where there is no golden band, the brownish-black extending outward to the edge of the wings, with only a

sub-marginal row of yellow spots across both wings. This variety is named *Hippolyta*.

I have never seen a variety of any kind, sexual or other, on the West Coast.

225. *Vanessa Californica*.

PLATE XXII; Figure 225.

Fig. 225, Male, Mountains of So. Cal., 5,500 feet altitude, June, 1889; Author.

This is strictly a high mountain butterfly in the south, but in the north, about the Canada line, it flies at sea-level. In the south it never, at any season, comes lower than 4,000 feet elevation. It is a strong flier, and is the most pugnacious of all Coast butterflies, delighting to fight any other species at sight; and to the collector he is a pest, as he likes to drive off any more desirable kind.

In the growing days of early summer it likes to feed on the viscid dampness or gum that is found on the young leaves of the young balsam tree, *Abies concolor*, preferring that balsam to the nectar of flowers.

The larval food-plant is *Ceanothus thyrsiflorus*, the California lilac.

Variety, unnamed. I have noticed a variety of *Vanessa Californica*, where the apices of fore wing in both sexes are faded or paled, so that no markings are visible, but the variety is scarcely worth noticing.

226. *Vanessa Milberti*.

PLATE XXII; Figures 226, a.

Fig. 226, Male, Juneau, Alaska, July 1, 1891; Author.

a, Male, Vancouver Island, June, 1891; Author.

I figure here two examples of *Milberti* to show the effect of a northing in the habitat, the second and the whiter one living about a thousand miles to the southward of the first, darker, one; and another thousand miles' southing makes the sub-marginal band nearly all white, instead of orange.

In the south, near the Mexican line, the species is strictly a high mountain one, like *Californica*, and is never seen at a lower elevation than 4,000 feet, but at the Canada border it flies at sea level. I have never found this butterfly at all common at any place.

Genus PYRAMEIS.

A small genus of nearly world-wide flyers. Similar in most points to the Vanessans, and at some time classed with them under the genus name of Vanessa, but now generally considered a separate genus.

These, like the Vanessans, are short-bodied, and strong flying butterflies; they are great feeders on flowers, and are individually long-lived and vigorous.

The indications as to sex are the same as in the Vanessans.

227. Pyrameis Atalanta.

PLATE XXII; Figure 227, Male, Southern California, 1890; Author.

This is so common and well known that no words are required. It flies over almost the whole world, and is known to nearly every race of men.

Larval food-plant is nettles.

228. Pyrameis Huntera.

PLATE XXII; Figure 228, Male, Southern California, 1888; Author.

The figure shows the underside of the male, as the large ocelli on the hind wing are the most significant points in the determination of the species. On the upper side it looks much like the next species, but it is much scarcer. It is in the south a mountain flyer, and in the north as well, though not to so great a degree. Huntera flies over the whole of the United States, being, as stated, rare; it is, however, very wary, and not easily caught, so that it is not so very rare as at first appears.

229. Pyrameis Cardui.

PLATE XXII; Figure 229, Male, Southern California, 1890; Author.

This also is almost universal, being known practically everywhere. It was named Cardui on account of its being found feeding on carduus or thistle, but rather unfortunately so, as the larvæ feed on very many plants, and of them all thistle seems to be about the last one that is used, and then, as a last resort; this, at least, on the West Coast. Here, amsinkia is the plant which is preferred.

Cardui has a habit of occasionally migrating in endless numbers, as written upon in another part of this book, under the head of Migrations.

231. *Pyrameis* Carye.

PLATE XXII; Figure 231, Male, Southern California, 1895; Author.

This species resembles somewhat the preceding, on both the upper and lower sides, but it can be recognized at a glance on account of the tip of the fore wing being cut off square, and not rounded. It is not anything like as universal as the preceding, being found only on the West Coast of both Americas, and in the United States not going east of Nevada, or perhaps Utah.

The larval food-plant is *Malva rotundifolia*. This fact I have proved many times.

Hybrid. No figure. Many years ago Mr. H. Edwards noted a hybrid of Carye and *Atalanta*. It seems scarcely worth mention.

Muelleri. No figure. A variety known as *Muelleri* is of occasional occurrence; in this variety all wings are blurred or flushed with fulvous, at the expense of the black markings, and the white spots are elongated and obsolescent.

234. *Junonia* Cœnia.

PLATE XXIII; Figure 234, Southern California, June, 1880; Author.

The figure is that of a male. *Cœnia* is a plains and valley butterfly, where they are very abundant from spring to fall; but they do not frequent the hills and mountains. *Cœnia* is somewhat common over most of the temperate States of the Union, also in Canada, and Mexico, to some extent.

The sexes look much alike; the determination is by the lappets, and by the size and shape of the body.

The preliminary stages are well known; the larvæ feed on antirrhinum, plantago, and some other plants; probably on the Coast the antirrhinums afford most of the food for the larvæ.

235. *Junonia* Genoveva. Not elsewhere illustrated in America.

PLATE XXIII; Figure 235, Mazatlan, Mexico, Jan. 10, 1888; Author.

Genoveva is mostly a Mexican butterfly, but comes north far enough to get within Arizona territory along the southern bound-



dary, and ought to be taken at Yuma, and along the Colorado River, but there are no notes of any such capture; yet it may be looked for at any time.

The sexes, as in *Cœnia*, look much alike, and are to be determined same as *Cœnia*. The figure is a male.

Genus LIMENITIS.

The species of this genus are all of medium or large size, and mostly black in color, with white or yellow markings. The antennæ are nearly as long as the body, the club being an insensible enlargement; the wings never have any ocelli, nor any tails. The eggs are placed singly on the tip of the leaf, and the larva lies hidden along the midrib, during its early stages.

The sexes are much alike, and determination is difficult until you become acquainted with the several features which help in the matter.

236. *Limenitis Arizonensis*.

No figure.

This is a variety of the Eastern *Limenitis Astynax*; the whole upper side of the wings being bluish-black, even the submarginal white spots seen on *Astynax* being suffused or over-washed with the ground-color, so that there is scarcely any white to be seen. The form known by this name is rare, and is not known outside of Arizona that I know of, so that it has but little interest for West Coast people.

237. *Limenitis Weidmeyer*.

PLATE XXIII; Figure 237, Northern Arizona, July, 1890;
F. Stephens.

Weidmeyer inhabits the countries of the Great Basin, all the States between the Rocky Mountains and the Sierra Nevadas, from Canada to Mexico; but it is not seen to the west of the Sierra Nevadas in the States of the Coast, proper; unless at the eastern base of the range, in Southeastern California, or in the semi-desert regions of Eastern Oregon and Eastern Washington.

As in the previous species, the sexes look much alike, and are to be determined in the same way.

The preliminary stages of Weidmeyer's are not yet made known.

The food-plants are probably salix, populus, and perhaps some others, as some of these desert butterflies are inclined to be omnivorous.

238. *Limenitis Sinefascia*.

No figure.

Sinefascia is a variation of *Weidmeyer's*, similar to what *Arizona* is of *Astynax*, namely, a form in which the median band of white spots becomes obsolete, or at least obsolescent, and the whole wing is covered with the black ground-color, no white spots being present.

239. *Limenitis Obsoleta*.

PLATE XXIII; Figure 239, Tucson, Arizona, June, 1887;
Author.

This is a figure of a male. *Obsoleta* is a very peculiar looking thing for a *Limenitis*; it looks much more like a *Danais*; in fact, it is often mistaken for *Danais Berenice*, being the same color and the same size; but the peculiar venation, with the cell of the hind wing open, places it in with the *Limenitis*. This has always been rather rare, and still is so, although it has been sought after so much of late years that it is not now so rare as formerly.

Obsoleta is found in Southern Arizona only. It is fond of sailing around the cottonwood trees, and so high up that the collector needs a ladder to climb up on to get them. In flight they more resemble a *Danais* than a *Limenitis*; they do not sail around with wings extended out flat, as do the *Limenitis* proper, with that twitching of the wings which is so peculiar.

The preliminary stages of *Obsoleta* have never been studied out.

The larval food-plant is, doubtless, populus, the leaves of the cottonwood tree; possibly, also, willow.

240. *Limenitis Lorquini*.

PLATE XXIII; Figure 240, Vancouver Island, June, 1891;
Author.

Figure, male. This example is selected from among many others to show the effect of climate, in causing the apices to be so scantily reddened, for in those specimens taken at the south the red apices are much more obvious; it is also small in size, as befits that cold region, and the band of white spots is smaller, in harmony with the small red apices.

Lorquini has the regular *Limenitis* manner of flight—a series of short, twitching motions, with the wings out flat, sailing about in a very leisurely manner, apparently having nothing to do but to sun itself, and to have a good time.

The larval food-plant is *salix lasiolepis*, or common water-willow; and the female lays one egg solitarily on the tip of a young leaf. The egg is white, long, and spindle-shaped. I do not know that any one has ever followed out the stages of larva and chrysalis, though it would be quite easy to do so.

241. *Limenitis Eavesi*.

No figure.

Eavesi is a variety of *Lorquini*, with the red of the apices obsolete or not present, and sometimes some indications of white submarginal spots on hind wing. It is said to be rather common in British Columbia and Alaska, and has been given varietal names by different writers, *Eavesi* being one, and *Burrisoni* another. It is simply a cold-weather form of *Lorquini*, and found only in cold, northern localities.

Genus HETEROCHROA.

This genus is made for a single species and a variety, the two names are *Bredowi*, and *Californica*; though it would be difficult to say which of them is the stem and which the variety, as they are simply climatic varieties, *Bredowi* of the north, and *Californica* of the south.

The sex-marks are difficult to distinguish, for the beginner.

The food-plant is *quercus*, the evergreen oak tree leaves.

242. *Heterochroa Bredowi*.

No figure.

Bredowi is like unto the next species, *Californica*, except that the band of spots across both wings is white instead of yellow, as in the Figure 243. The average size of the two forms shows *Bredowi* to be the smaller of the two, and its habitat is to the northward.

243. *Heterochroa Californica*.

PLATE XXIII; Figure 243.

Californica is a mountain butterfly, inhabiting the canyons along the mountain sides rather than the higher slopes and crests.

Its manner of flight is to sail along with the wings out horizontal, giving little twitches of the wings to help it along, and circling about, to watch the visitor, and soon returning to the place whence it started, as it has places of vantage from which it can observe everything that goes on in its neighborhood. They are very fond of sipping water at wet places on the ground, but they do not hover together so gregariously as do some other species.

The sexes are very similar in appearance, and must be determined by the lappets, and the body, the same as most of this class of butterflies, as has been already explained.

The larval food-plant is quercus, oaks of the evergreen, or chrysolepis order or type.

Genus APATURA.

There are no *Apatura* butterflies on the West Coast proper, and but two varietal forms are found on the mountains of Eastern Arizona, so that this genus has very little of interest for us. I give two figures, to show the style of these Eastern species, more than for anything else. *Apaturas* live on trees and bushes, such as *prunus* and *celtis*, that is, the larvæ do.

244. *Apatura Celtis*.

PLATE XXIII; Figure 245, from Colorado; T. L. Mead.

This is a typical Eastern form. The *Apaturas* differ one from another in size, and in color a little, but the chief key is the ocellus in the hind part of the fore wing; some have none, others have one, and others two. *Celtis* has but one.

245. *Apatura Montis*.

No figure.

Montis is a Western form of the Texan species *Antonia*; the typical species does not come to Arizona, but *Montis* is found in the eastern mountains. *Montis* is larger and darker than the figure of *Celtis*, foregoing, and has on the fore wing two ocelli, the upper one being pupilled with white so broadly that the ocellus is nearly obliterated.

246. *Apatura Leila*.

PLATE XXIII; Figure 246, Male.

This figure is a good one of *Leila*, which is found sparingly in the mountains of Eastern Arizona. The female is larger in size, and lighter in color, than the male.

Genus PAPHIA.

This is a sub-tropical genus, distinguished by their falcate wings and their bright red coloring. There is no *Paphia* on the West Coast, and I give Figure 247 and b only to show the peculiarity of the species.

247. *Paphia Andria*.

PLATE XXIII; Figures 247, Male; b, Female; from Herman Strecker.

This species is not represented in any of the countries west of the Rocky Mountains, and but slightly west of the Mississippi River, except in Texas.

248. *Paphia Morrisoni*.

No figure.

Morrisoni is found in Eastern Arizona, only, not being known from any other locality. It is paler than *Andria*, and the sexes are both marked with a sort of lighter band, like that on Figure 247b, the female *Andria*, near the margin of both wings; the band being cut by black so that the band is a series of spots rather than a band proper.

This name stands in the catalogues as that of a good and full species, but it never was described by any one. Mr. Edwards speaks of this butterfly, and says that he will describe it under this name, but never has done so.

Genus SATYRUS.

A large and interesting group of butterflies, well represented on the West Coast. All the species of *Satyrus* have, to a large degree, a similar appearance, on both upper and under sides; some different species are so nearly alike on the upper side that by that side

alone they could not be separated, but the determining features are found on the under side; this feature, however, is not confined to this class of butterflies alone, but is present in other genera, as well.

Satyrids seldom or never feed on flowers, but spend their time in sitting idly on the ground, doing nothing. All of them have a habit of alighting on the ground as a resting-place; usually each individual has a particular spot to which it will return again and again. Several of the species, when alarmed, will fly precipitately to the cover of some thorn-bush, or hide by alighting in some inaccessible place, rather than fly about, so that they are rather vexatious things to hunt for. All are of weak flight, and they do not attempt to escape their enemies by flight alone, but will hide and remain quiet and still, simulating death as much as any butterflies can do.

All satyrid larvæ feed on grasses, I believe; and if confined, the females will lay their eggs on the enclosing net, or on any object that is at hand.

The sex-marks are larger size, and more ocelli, on the female wing, and also the abdomen of the female is larger and heavier than that of the male.

249. *Satyrus Stephensi*, n. s.

PLATE XXIII; Figures 249, b, c.

Fig. 249, Male, Northeastern California, 1894; F. Stephens.

b, Female, Northeastern California, 1894; F. Stephens.

c, Female, underside, Northeastern California, 1894; F. Stephens.

As the plate shows so well, this is the grandest *Satyrus* of the West Coast, or, for that matter, of any coast of North America. The examples have been in my possession since the date above cited, ten years, awaiting this opportunity to be shown to the world.

Characters: $2\frac{1}{4}$ to $2\frac{1}{2}$ inches expanse; basal half of both wings, gray-brown, not darker at base; light buff band nearly half an inch broad across both wings, not varying, except narrower and dusky near anal angles; two dark brown, white-pupilled ocelli on fore wings, the apical one in the female is slightly twinned;

and on hind wings one similar ocellus, with one, two, or three small blind ocelli on each; dark brown margin in two lines, on both wings, the inner one darker, and cut by the nervures.

Underside, both wings, base light brown, with fine brown mottlings disposed transversely; a brown, obtuse V in cell of hind wing; the outer half of fore wing nearly as above; the outer half of hind wing is lighter than the basal part, but is similarly mottled, and includes six white-ringed and white-pupilled ocelli, arranged in two series of three each, the middle ones in each series being larger than the others.

The country whence this species comes, as I understand from Mr. Stephens, was at one time volcanic, and now is a sort of Dead Sea region of wide, sandy wastes, draining into dead salt lakes and marshes that have no outlets. The whole country adjoining, in Nevada and in Oregon, seems to be similar: a dreadful salt desert, wherein this beautiful butterfly is perhaps the only object of beauty.

250. *Satyrus Gabbi*.

PLATE XXIII; Figures 250, b.

Fig. 250, Male, Northeastern California; F. Stephens,
1894.

b, Male, underside, Northeastern California; F.
Stephens, 1894.

The figures of the male given herewith are the subjects of illustration, because the male has never before been figured. The female, as in all *Satyrids*, is larger and paler, both above and below, than the male.

Gabbi is one of the rare species of the country; it is a very fine and handsome species, and, with *Stephensi* and *Wheeleri*, is noted for the size of the six perfect ocelli on the hind wing. *Gabbi* was taken prior to 1880, in which year it was named; since which time it seems to have become lost, and well-nigh unknown. I have never seen the living insect.

250a. *Satyrus Wheeleri*.

No figure.

This is one of the "lost butterflies." It was found in 1872, along the eastern base of the Sierra Nevada Mountains, by a Government expedition, but has never been seen by any one since that time.

The appearance of *Wheeleri* is similar to the preceding, *Gabbi*, and might easily be mistaken for that species; it has more of a white-and-black appearance, and is not so red as *Gabbi*, and the apical ocelli are supposed to be all of them twinned, or to have an echo on the lower side; and on under side of fore wing both the ocelli are twinned, the echoes being between the two large ocelli. But probably not enough of them have ever been taken to make sure of these things, as the *Satyrids* are subject to variations among themselves, on these minor points.

Wheeleri was illustrated by Edwards, in Butt. N. A., in 1877; by Mead, in *Wheeler's Expedition Report*, in 1875; and by Strecker, in Lep., pl. 4, 1873, and pl. 8, 1874, under the name of *Hoffmanni*.

251. *Satyrus Nephele*.

PLATE XXIII; Figures 251, b.

Fig. 251, Male, New York State, no data; H. Strecker, 1880.

b, Male, underside, New York State, no data; H. Strecker, 1880.

Nephele inhabits the New England and Middle States, and is said to fly as far west as the Sierra Nevadas and the Cascade Range of mountains in Oregon and Washington; or, as one writer says, to the Pacific Ocean. I have never taken it in the western parts of the Pacific States, and do not believe that it flies so far west; moreover, I think it a very rare thing west of the Rocky Mountains.

The number of ocelli on underside of hind wings varies from one to six; this figure, b, shows as many ocelli as are ever present.

252. *Satyrus Boopis*. Not elsewhere illustrated.

PLATE XXIV; Figures 252, b.

Fig. 252, Male, Tenino, Washington, Aug. 1891; Author.

b, Male, underside, Mt. Shasta, Cal., 1891; Author.

Boopis is one of the *Ariane* group, and is quite widely distributed over the northern parts of the States of the West Coast, on the mountains of moderate height, as well as near the sea-coast. Like so many *Satyrids*, it is variable, especially as to the ocelli. The chief characteristic or key is the wide indefinite yellow halo around the ocelli on fore wing.



253. *Satyrus Ariane*.

PLATE XXIV; Figures 253, b.

Fig. 253, Male, Shoshone, Idaho, July, 1891; Author.

b, Female, Truckee, Cal., July, 1893; Author.

Ariane is the most abundant Satyrid of the Coast; it is especially abundant on the lower slopes of the high mountains, where it flies in countless millions, on the mountains of Northern California, Oregon and Washington, as well as to the east, in Idaho and Montana. It is also said to be abundant in all the northern States of the Mississippi Valley.

254. *Satyrus Baroni*.

PLATE XXIV; Figures 254, b, c.

Fig. 254, Male, Portland, Oregon, July, 1890; Author.

b, Female, Northern Cal., July, 1891; Author.

c, Female, underside, Portland, July, 1890; Author.

Baroni is very dense, smoky black on upper side, and dark on underside, yet all the markings are distinct. Baroni was taken in Northern California, by O. T. Baron, for whom it was named, about 1879. This species is one of the Ariane group, but the yellow halo about the ocelli of the fore wings is absent.

255. *Satyrus Incana*. Not elsewhere illustrated.

PLATE XXIV; Figures 255, a.

Fig. 255, Male, Tenino, Washington, Aug. 9, 1891; Author.

a, Male, underside, Northeastern California, 1894;
F. Stephens.

This is a rare butterfly, not often taken, and heretofore only known from Washington; but this second figure is from a specimen taken in the desert region of Northeastern California, a very different environment from that of the damp, fertile lowland about Puget Sound, where Incana is usually found. Incana is a member of the Ariane group, and is separated by the whitish outer part of the hind wing on the under side.

256. *Satyrus Cetus*.

PLATE XXIV; Figures 256, b, c.

Fig. 256, Male, Tehachapi Mountains, California, 1890;
Author.b, Female, Tehachapi Mountains, California, 1890;
Author.

c, Female, underside, Tehachapi Mountains, California; Author.

This is a very pale and faded-looking butterfly; it is the lightest of all the Satyrids, having a washed-out appearance, even when fresh and bright. The upper side has a satiny gloss, and a light bronzy reflection which is peculiar, in fact unique, in a Satyrid, and which is not adequately shown on the plate, as it is one of those elusive colors that escapes the photographic lens. The peculiar twinning of the ocellus of Figure *c* is an oddity; several of the females in my cabinet have twinned ocelli, sometimes the apical one, and again the inner one is twinned; they seem to have no fixed plan about it.

257. *Satyrus Paulus*.

PLATE XXIV; Figures 257, b, c.

Fig. 257, Male, Southern California, Riche Canyon, 1885;
Author.

b, Female, Glenwood Spring, Colorado, Aug., 1892;
W. H. Edwards.

c, Female, underside, Truckee, Cal., July, 1890;
Author.

Paulus is rather a dry-land, tropical species; it loves hot, semi-desert places, and I have generally found it in localities where the grass is all dry and dead, and apparently the eggs must wait till the next spring before they hatch, as there is no green grass for the larvæ to feed upon in the localities where the butterflies live. *Paulus* is a lazy thing, it never flits about, or sips on the flowers, but just sits still and you do not see it till it starts up at the approaching footfall, when it takes refuge at once under some friendly bush, where it cannot be reached by the net.

258. *Satyrus Charon*.

PLATE XXIV; Figures 258, b, a.

Fig. 258, Male, Mountains of Central California, 1891;
Author.

a, Male, underside, Mountains of Central California, 1891; Author.

b, Female, Helena, Montana, June, 1890; Author.

Charon is very abundant, and widespread as well. It lives at moderate elevations, in the valleys and among the foothills of the larger mountains, but is never seen on the plains. The figures show this species very well indeed. It is sometimes mixed with

or confounded with the next species, so they are put close together for comparison.

259. *Satyrus Silvestris*.

PLATE XXIV; Figures 259, a.

Fig. 259, Male, Truckee, Cal., 1890; Author.

a, Male, underside, Truckee, Cal., 1890; Author.

This has been called a variety of the preceding, Charon, but it is abundantly distinct. The whole butterfly is darker, and especially on the underside the difference is well marked. I have figured the underside of the male of each species, and have placed them as close together as possible, for the purpose of comparison. The underside of *Silvestris* is a homogeneous dusky or brownish-black, quite different from any other *Satyrus*.

260. *Satyrus Sthenele*.

No figure.

This species is now considered extinct. It was taken on Lone Mountain, to the westward of the city of San Francisco, in the early days of that city, and was at that time common; but eventually it disappeared, at about the same time as another species, *Lycæna Xerces*, and it has not returned, although the *Xerces*, after being absent about thirty years, has reappeared. So it is probable that *Sthenele* will in time also come back again, at some nearby place, if not in that particular spot.

The description is: "Expanse, 1.2 to 1.5 inches; brown; fore wings with two white-pupilled ocelli, circled with yellow; hind wings without spots; under side ashy-gray, deepest at base; fore wings with two large pupilled ocelli circled with yellow; hind wing crossed by broad angular band, and marked near anal angle with two little ocelli."

Genus EREBIA.

The species comprising this genus are all rather small in size, very dark brown in color; usually eyed on one or on both wings. Most of them are arctic in habitat, or found on the high mountains in the temperate regions.

There are none of them now known on the immediate West Coast, and only one in the Yellowstone Park and Alaska, though

it is likely that one or more species will yet be found on some of the higher peaks of the Sierra Nevadas or the Cascades.

Sex-marks for *Erebia* are same as for *Satyrus*.

261. *Erebia Callias*.

PLATE XXIV; Figure 261, Male, from Colorado; D. Bruce.

Callias has not yet been found on the West Coast, but it would not be surprising if it were to be found at any point along the Sierra Nevadas, from Mt. Whitney northward.

262. *Erebia Epipsodea*.

PLATE XXIV; Figure 262, Male, Spokane, Washington, 1892; Author.

Epipsodea is common all along the Rocky Mountains, from the peaks in New Mexico and Colorado to Alaska; the species is especially abundant in Eastern Washington, where it is found on the lowlands, as about Spokane, where it frequents localities that are scantily wooded, and the brushy hillsides. There is no apparent reason why the species may not be looked for on the Cascades, on such mountains as Mt. Hood, or Mt. Baker, or on the Olympian Mountains.

263. *Erebia Sofia*.

PLATE XXIV; Figure 263, Male, from Yellowstone Park; Dr. Barnes.

Sofia is as yet known only from the Yellowstone Park, and from Alaska, although there seems to be no apparent reason why it should not be found to the westward of the Park, in the Cascades, and the Olympians.

264. *Erebia Magdalena*.

PLATE XXIV; Figure 264, Female, from Colorado, 1890 (?); D. Bruce.

This is a large-sized *Erebia*, and it is peculiar in that there are no eye-spots on either wing. At present it is not known from any other locality than Colorado, but, as with other *Erebias*, it should be looked for on mountains further west, and north.

265. *Erebia Youngi*.

No figure.

This is a variety of *Magdalena*, from Alaska, with which I am not acquainted. On both fore and hind wings are submarginal





series of eye-spots of red, pupilled with black, similar, apparently, to Epipsodea.

266. *Neonympha Henshawi*.

PLATE XXV; Figures 266, b, c.

Fig. 266, Male, Santa Rita Mountains, Ariz., 1892; F. Stephens.

b, Female, Santa Rita Mountains, Ariz., 1892; F. Stephens.

c, Female, underside, Santa Rita Mountains, Ariz., 1892; F. Stephens.

This species flies in Colorado, New Mexico, and Southern Arizona; it can scarcely be considered as belonging to the West Coast fauna, and has but little, if any, interest for us.

267. *Neonympha Haydeni*.

PLATE XXV; Figures 267, b, c.

Fig. 267, Male, Yellowstone Park; no data.

b, Female, Yellowstone Park; no data.

c, Female, underside, Yellowstone Park; no data.

Haydeni is a species similar in many respects to the preceding; it inhabits a more northern region, not coming so far south at any point as Henshawi; in fact, being semi-arctic in habitat, living on high mountains and at a northern habitat. Both sexes have beautiful little gem-like eyes or ocelli on the margin of hind wing, beneath.

268. *Neonympha Rubricata*.

PLATE XXV; Figure 268, Male, Santa Rita Mountains, 1892; F. Stephens.

In habits, habitat, and everything except color, this species is similar to Henshawi, which stands just above it on the plate. The same eye-spots shown on the upper side appear on the underside, and some smaller ones also.

269. *Epinephele Xicaque*. Not elsewhere illustrated.

PLATE XXV; Figure 269, a, Male, underside, Arizona; Dr. Kunze.

This is quite new to American territory, having recently been found in Southern Arizona. It is properly a Mexican species, and has little interest for us, except for the fact that it comes over the line a few miles.

270. Neominois Ridingsi.

PLATE XXV; Figures 270, b.

Fig. 270, Male, Colorado, no data; Mr. Nash.

b, Female, Central Montana, July, 1892; Author.

This is a Great Basin butterfly, inhabiting all the States between the Rocky Mountains and the Sierra Nevadas, being found in the hills and smaller mountains, but not on the plains. It may be looked for in Eastern Oregon and Washington.

271. Neominois Dionysius.

PLATE XXV; Figures 271, b.

Fig. 271, Male, Western Colorado, no data; from W. H. Edwards.

b, Female, Western Colorado, no data; from D. Bruce.

Dionysius is another Great Basin butterfly; is not now known west of Utah, but there is no apparent reason why it should not be found at the eastern base of the Sierra Nevada Mountains, and up to the Cascades.

Genus CÆNONYMPHA.

This genus, like the *Anthocharis*, finds its metropolis on the West Coast of the United States, and, to be more definite, in California. Of the twelve species on the West Coast only one ranges through the northern States of Montana and Minnesota, and thence through Canada to New Foundland; so that all the North-eastern, Middle and Western States have none at all; while further south one species reaches eastward to Kansas. The Rocky Mountains are scantily supplied with them; also the vast regions of the Great Basin, up to the Sierra Nevadas. California probably has more *Cænonymphas* than all the rest of the United States.

Cænonymphas fly on the plains and in the valleys and on the foothills, but do not go high up on any mountain; about 4,500 feet is the limit. All these species fly in an uncertain, gentle manner, and they are easily caught. When in confinement, as in a net, for the purpose of getting eggs, they are tractable, and will lay their eggs on the net which secures them, or upon anything else that comes handy, like all *Satyrids*, not requiring any kind of a food-plant on which to oviposit them.

272. Cænonympha Californica.

PLATE XXV; Figures 272, b.

Fig. 272, Male, Mendocino County, Cal., June, 1893;
Author.b, Female, underside, Central Cal., June, 1893;
Author.

The first five species illustrated, 272, 273, 274, 275, 276, 277, are very much alike, being perhaps seasonal or local sub-species or varieties of the same stock, being similar on upper side, and only minor differences appearing on the under side, and all the features are in good degree variable, and merge into one another. But I take things as I find them, and will illustrate all the forms according to the distinctions as they are handed down to us by the authors.

Californica is sometimes called the summer form. I would rather call it the northern form, as it is common in Central California, but does not appear in the southern part of the State at all.

273. Cænonympha Galactinus.

PLATE XXV; Figures 273, b.

Fig. 273, Male, Southern California, May, 1889; Author.
b, Female, underside, Southern California, May,
1889; Author.

Galactinus is the southern local form, abundant in the south, and not flying in the north; a little smaller, and browner on the under side, and with fewer eye-spots.

274. Cænonympha Eryngi.

PLATE XXV; Figures 274, b.

Fig. 274, Male, San Diego County, 1889; F. Stephens.
b, Female, underside, Riche Canyon, S. Cal., 1891;
Author.

This form is still a size smaller than the preceding; somewhat yellowish on the upper side, especially on apices and margins, with a satiny luster, and yellowish over all the under side, blackish at base of hind wings; more eye-spots.

275. Cænonympha Ceres.

PLATE XXV; Figures 275, b.

Fig. 275, Male, Southern California, 1890; Author.
b, Female, underside, Southern California, 1890;
Author.

Small in size, white above, with satiny gloss; on under side the male has no eye-spots on either wing, and the female has one or two very small ocelli, or perhaps only dots, on hind wing. Beneath the shading is dusky, the base but little darker than margin; the discal dash on fore wing is broad, but not contrasting, extending half way across the wing; on hind wing the dash is broken, with a spot at anal angle.

276. *Cænonympha Pulla*.

PLATE XXV; Figures 276, a.

Fig. 276, Male, no data, 1880 (?); Author.

a, Male, underside, no data, 1880 (?); Author.

Small size, white, somewhat sordid, not having satiny gloss; under side very dark, with a reddish tint; on fore wing no discal dash, and on hind wing only a spot to indicate it; the male has two or three eye-spots on hind wing, and the female usually has an apical one also. *Pulla* is rare, and all my specimens were taken many years ago, before I realized the value of data.

277. *Cænonympha Kodiak*.

PLATE XXV; Figures 277, b.

Fig. 277, Male, Pyramid Harbor, Alaska, July, 1892; Author.

b, Female, underside, Pyramid Harbor, Alaska, July, 1892; Author.

Size of *Galactinus*; white above, with no markings except as the discal dash of under side shows through the white wing; under side dusky-brownish, the inner part of fore wing much lighter; two eye-spots on fore wing beneath; and *Kodiak* is the only white species that shows the eye-spots of fore wing more prominently than those on hind wing; discal dash slight.

278. *Cænonympha Elko*.

PLATE XXV; Figures 278, b.

Fig. 278, Male, Spokane, Washington, May, 1890; Author.

b, Female, underside, Washington, May, 1890; Author.

Elko is average size; pale orange-yellow with a faint discal flush, but otherwise the color is even over both wings. Under side the hind wing is darker than the fore wing; the discal dash is inconspicuous on fore wing but strong and angular on the hind wing; one apical, and one anal eye-spot.

279. Cænonympha Inornata.

PLATE XXV; Figures 279, b.

Fig. 279, Male, Central Montana, June, 1892; Author.

b, Female, underside, Central Montana, June, 1892;
Author.

Inornata is rather a northern species, and is not at present known on the West Coast, south of the Canada line; it should be found in British Columbia, and thence east through Canada to New Foundland; is known in our Northern States only in Montana and Minnesota.

280. Cænonympha Ampelos.

PLATE XXV; Figures 280, b.

Fig. 280, Male, Victoria, Vancouver Island, July, 1891;
Author.b, Female, underside, Vancouver Island, July, 1891;
Author.

Ampelos is of a buffy color, dusty or sordid, somewhat, and the underside is very dark, the darkest of all the species; there are no eye-spots on either wing. Ampelos is chiefly from Vancouver Island, and is said to have been taken in Nevada, Montana, Oregon and Washington, but I think that some of these localities are theoretical only.

281. Cænonympha Ochracea.

PLATE XXV; Figures 281, b.

Fig. 281, Male, Colorado; sent me by Dr. Barnes.

b, Female, San Francisco Mts. of Arizona, 1892;
Stephens.

This is the deepest ochre-colored species of all the Cænonymphas, whence the name. On the underside it is the most ornamented of any of the species. It is found on the Rocky Mountains, and in Arizona, and perhaps all of the States of the Great Basin, but does not come west of the Sierra Nevadas.

282. Cænonympha Brenda. Not elsewhere illustrated.

PLATE XXV; Figures 282, a, b.

Fig. 282, Female, Sisson, Northern California, 1890 (?);
Author.a, Male, underside, Greenhorn Mountains, June,
1888; Author.b, Female, underside, Mts. of Southern Cal., 1892;
Author.

This fine species was published in 1869, and, as shown above, is widespread, yet is one of the rarest butterflies of the West Coast. The figures show the beautiful insect very well; it is not white, but there is a delicate tint of chocolate-brown all through, on upper and under side, quite unlike any other *Cænonympha*. It is a mountain species, and flies higher on the mountains than any other *Cænonympha*.

283. *Cænonympha Pamphilus*.

PLATE XXV; Figures 283, b.

Fig. 283, Male, Judith Mountains, Montana, July, 1892;
Author.

b, Female, underside, Judith Mountains, Montana,
July, 1892; Author.

This species scarcely comes within our limits, as it is a Great Basin species, although set down in the books as a Californian species, but I have never taken one in California, nor have I ever seen one that was taken here; yet, of course, it may have been. It is said to live in Utah, and as I have taken it in Montana, it probably inhabits all of the States of the Great Basin.

Genus CHIONOBAS.

Medium-sized, wood-brown butterflies; remarkable for color, flight, and habits. All the species have a characteristic family likeness, so that no one of them can well be mistaken as belonging to any other genus. These butterflies seldom or never feed on flowers, or sip at water in damp places. Evidently their individual lives must be short, and are spent solely in play and in the reproduction of the species. They pass the time during the sunny day hours in sunning themselves upon the bare rocks, or on the spots of bare ground in the grassy places where they live, starting up now and then to pursue any flying thing that may come along, returning to the same place again. Their manner of alighting is peculiar, hesitating, as if in doubt whether it may be safe or not, and then with wings all upraised, they drop upon their favorite perch.

The determination of species is chiefly by the under side.

The determination of sex, is by the ocelli, the size of abdomen, and relative size of the specimen; also the female usually has more



blind ocelli or dots on the wings than the male, and the tip of the abdomen is differently shaped, as seen in the Figures 288*a* and *c*.

Like all the Satyrids, the female will oviposit on the net which confines her, just as well as on a plant. The larvæ feed on grass.

284. *Chionobas Gigas*.

PLATE XXVI; Figures 284, a, b, c.

Fig. 284, Male, Vancouver Island, July 3, 1891; Author.

a, Male, underside, Vancouver Island, July 3, 1891;
Author.

b, Female, Vancouver Island, July 3, 1891; Author.

c, Female, underside, Vancouver Island, July 3,
1891; Author.

Gigas is found about the bald knobs of the mountain tops which largely form the elevations of Vancouver Island; the mountains are heavily forested with fir trees, and these bare rocky knobs are the only open places on the heights. There are little open, grassy valleys on the lowlands, but *Gigas* never goes there. The males stay about those bare rock-knobs, flirting and playing during the few sunny hours that shine upon the rocks in that cloudy, raw climate; the females are more quiet, keeping about the base of the rocks, and lay their eggs upon the fine grass-blades that spring up about the rocks. I conclude that the butterfly can not live more than four or five days in the best of weather. The paragraph on "stranded butterflies," in another part of this book, applies peculiarly to this species.

The determination of species is almost wholly from the under side, the striations being uneven, or, as I call it, congested.

285. *Chionobas Nevadensis*.

No figure.

The name of *Nevadensis* standing in the catalogues, was published two years prior to that of *Californica*. Both names were published by foreigners, and the types, if they yet remain, are probably in France, and are not readily seen, or compared with recently-taken specimens. I have never seen an authoritatively-labeled *Nevadensis*, but I believe that it stands for the same butterfly that I call *Californica*; and whenever that shall be established as a fact instead of being merely guessed at, as at present, the name *Californica* will have to be dropped and *Nevadensis* used instead, as priority governs in such cases.

286. *Chionobas Californica*.

PLATE XXVI; Figures 286, a, b, c.

Fig. 286, Male, Klamath River Basin, 1890; Author.

a, Male, underside, Klamath River Basin, 1890;
Author.b, Female, Northeastern California, 1894; F.
Stephens.c, Female, Northeastern California, 1894; F.
Stephens.

Californica inhabits the grassy foothills where the pine and oak trees are scattered scantily about, and the soil is covered with scanty grasses, which, at the time that the butterfly is in flight are dried up and dead for that year. The butterflies alight upon spots of dried ground or among the dead herbage, as stated under the genus heading.

The male here figured was taken by me in the Klamath country, and was sent to Mr. W. H. Edwards, and returned named "*Californica*," being one among many so returned.

This is not one of the "stranded butterflies," and is never seen on cold or alpine heights, but frequents warm and sheltered places.

The determination of this species is chiefly by the under side, the striations being even, smooth, not contrasting.

287. *Chionobas Iduna*.

PLATE XXVI; Figures 287, a, b, c.

Fig. 287, Male, Northwestern California, 1891; Author.

a, Male, underside, Northwestern California, 1891;
Author.

b, Female, Northwestern California, 1894; Author.

c, Female, underside, Northwestern California,
1894; Author.

Iduna inhabits the evergreen forests of Northwestern California. They never eat nor drink, and I know from personal observation that the flight lasts but a week. The male *Iduna* has habits that remind one of the *Limenitis*; they sail along with horizontal wings, and as they go they flicker their wings with a twitching flutter to keep up their motion, and then sail again on horizontal wings. The male *Iduna* has a fancy for alighting on the end of a twig, and sitting there with the wings out flat like a *Limenitis*; when thus on the watch, they will fly in alarm if the butterfly-

hunter comes within ten yards of them. The female is rarely seen; she has a furtive, rapid flight when hunting for a place to lay her eggs, and at other times remains hidden.

The determination of this species is from the under side, the striations being as depicted in the plate, somewhat intermediate between the two preceding species. But the collector is never in doubt, for *Iduna*'s habitat is entirely different from that of any other species, and no two species of these large *Chionobas* are ever found in any one locality.

288. *Chionobas Ivallda*.

PLATE XXVI; Figures 288, a, b, c.

Fig. 288, Male, Sierra Nevadas, 10,000 feet elevation, 1891; Author.

a, Male, underside, Sierra Nevadas, 10,000 feet elevation, 1891; Author.

b, Female, Sierra Nevadas, 10,000 feet elevation, 1891; Author.

c, Female, underside, Sierra Nevadas, 10,000 feet elevation, 1891; Author.

Ivallda has much the same habits as *Gigas*, in that they live on bare, rocky peaks, spending their whole time of the few days that they have to live in flitting about to one rock after another, having favorite alighting places on each rock. Such bare, wind-swept pinnacles seem to be inappropriate abiding places for such creatures as butterflies, but they simply will not live in any other place. These butterflies are very wary, too, and if you miss one it drops over perpendicular precipices where only winged things and flying machines can go, and there they stay. *Ivallda* is another species of "stranded butterflies."

The eggs are laid singly on or among fine grasses; the eggs hatch in twelve days; the larvæ are nocturnal, feeding by night and lying secreted by day.

289. *Chionobas Uhleri*.

PLATE XXVI; Figure 289, Female, Colorado; from T. L. Mead.

Uhleri is a Rocky Mountain species, and is not at present known to fly on the mountains of the Coast. Yet it may be found on mountains of moderate height, in any of the semi-desert localities of the Great Basin or in Eastern Washington or Oregon. I mean there is no apparent reason why it should not be so found.

290. *Chionobas Varuna*.

PLATE XXVI; Figure 290, Female, Belt Mountains, Mont., 1890; Author.

Varuna is much like Uhleri, but is larger, browner, and all the markings are stronger and more positive, and it lives in a more northern habitat. It never feeds on flowers, but, like all Satyrids, is short-lived, and has no other business but to play, and to carry on the work of populating the grassy slopes and vales where it lives.

Like Uhleri, Varuna should be found on foothills and moderate elevations quite up to the eastern base of the Cascades.

291. *Chionobas Subhyalina*.

PLATE XXVI; Figures 291, b.

Fig. 291, Male, Rocky Mountains; from D. Bruce.

b, Female, Rocky Mountains; from D. Bruce.

This species is from the mountains of British America, north of the United States, and is not supposed to live within our territory. I am not aware that it has ever been taken in Alaska, even; but if I were a butterfly-hunter, I would look for it on any of the high mountains of the Puget Sound country, or to the northward.

292. *Chionobas Brucei*.

PLATE XXVI; Figure 292, Male, Rocky Mountains of Colorado; D. Bruce.

Brucei is apparently the southern form of the preceding, Subhyalina, the chief difference being the median band on underside of hind wing, as well shown in the Plate.

Like the preceding species, this may be looked for on the mountains of the West Coast, although it is not yet known from any other than the Rocky Mountains.

Genus LEMONIAS.

This is a small genus of beautiful little butterflies, three species of which live on the coast proper, and three others are from Arizona. The coast species have a reddish ground-color, with white spots scattered over both wings, and the Arizona species have a dark ground with blackish spots, except Cleis, which has white spots.



All *Lemonias* are of gentle flight, feed freely of flowers, and live mostly on the plains and foothills, though some go up the mountain side to an elevation of 7,000 feet.

294. *Lemonias Mormo*.

PLATE XXVII; Figures 294, b.

Fig. 294, Male, Colorado Desert of California, 1885;
Author.

b, Female, Greenhorn Mountains, California, 1888;
Author.

The upper side of *Mormo* has never been illustrated previously. The species is not a recent one, having been named in 1859, but the butterfly is today a rare one, at least in California, and consequently it is not well known. In twenty-five years' collecting on the West Coast I have found it at two localities only, and those two are of widely differing environment, as noted above, one being a desert place approximately at sea level, and the other at 7,000 feet elevation on a forested mountain top. *Mormo* is said to be found in Utah, New Mexico, Arizona, as well as in California, and it may be that *Mormo* is more plentiful at some point where I have not been.

295. *Lemonias Cythera*.

PLATE XXVII; Figure 295, Female, Santa Rita Mountains, June, 1885; Author.

This is the largest of the white-spotted *Lemonias*. It is found on some of the mountains of Southern Arizona, as the Santa Ritas, the Catalinas, Huachucas, and others, but always, I believe, at an elevation of several thousand feet; thence southward into Mexico, as it is somewhat of a tropical species, and these Arizona mountains are its most northern points.

296. *Lemonias Virgulti*.

PLATE XXVII; Figures 296, b, c.

Fig. 296, Male, Southern California, 1890; Author.

b, Female, Southern California, 1890; Author.

c, Female, underside, Southern California, 1890;
Author.

This species, though rather local, is abundant, and it flies in its favorite restricted localities in countless numbers; it is an all-

season butterfly, of spring and summer and autumn alike, on the small hills and foothills and the mountain sides up to a moderate elevation.

The eggs are oviposited on the leaves of *Eriogonum fasciculatum*.

297. *Lemonias Palmeri*.

PLATE XXVII; Figures 297, b, c.

Fig. 297, Male, Colorado Desert of California, 1899;
Author.

b, Female, Colorado Desert of California, 1899;
Author.

c, Female, underside, Colorado Desert of California, 1899; Author.

Palmeri is not an orthodox coast dweller, as it lives in the deserts of the interior, at the bases of desert mountains. In its own localities it is extremely abundant, and flies in numbers about the bushes of *Beleperone Californica*, its larval food-plant. The bright red flowers of the plant are used by the Indians to make dye, red in color, but which fades to a yellow if not fixed by a mordant.

298. *Lemonias Nais*.

PLATE XXVII; Figures 298, b, c.

Fig. 298, Male, Santa Rita Mountains, Arizona, June, 1903; F. Stephens.

b, Female, Santa Rita Mountains, Arizona, June, 1903; F. Stephens.

c, Female, underside, Santa Rita Mountains, Arizona, June, 1903; F. Stephens.

I illustrate the male, female and the underside of this beautiful species. These were taken in the Santa Ritas, although it is stated that *Nais* lives only on the east side of the continental divide, so that statement is incorrect, for the Santa Ritas are in the basin of the Salt River, a tributary of the Colorado. I have no data as to the elevation at which these examples were taken, but it must have been at 5,000 to 7,000 feet altitude.

299. *Lemonias Zela*.

PLATE XXVII; Figure 299, Santa Rita Mountains, June, 1893; Stephens.

The sexes of *Zela* are very much alike, and one figure will sufficiently illustrate the species, especially as this Arizona form has but slight interest for us in the coast region.

300. *Lemonias Cleis*.

PLATE XXVII; Figure 300, Female, Santa Rita Mountains, 1903; Stephens.

This also is a mountain form from the Arizona mountains. It seems to be a Mexican form, just happening in American territory, as it is not known from any other locality than southern Arizona.

Genus CALEPHELIS.

A most charming group of very small butterflies, all of them distinguished by having two rows of plumbeous spots, like dull silver, on both sides of both wings, but most plainly seen on the under side. Two species are eastern, one of them coming west to California, and two are western, going eastward only to Arizona and Texas.

301. *Calephelis Borealis*.

PLATE XXVII; Figure 301, Female, Lake County, Cal., June, 1894; Author.

This example here figured was taken by the author in Central California, as noted, and it is the only one ever mentioned as captured west of Illinois. Presumably it is invading the West Coast, as some other species have done, and may in a few years become common. This specimen was taken in the mountains at an estimated elevation of 3,000 feet.

302. *Calephelis Australis*.

PLATE XXVII; Figures 302, b.

Fig. 302, Male, Yuma, Arizona; October, 1883; Author.

b, Female, Yuma, Arizona, October, 1883; Author.

Australis and the next, *Nemesis*, are much alike; *Australis* is the darker, and smaller, and generally marked by a dark band or curved shading across the middle of both wings, with the basal part darker than the marginal. I have found *Australis* more plentiful at Yuma than at any other point, although it is occasionally taken all over southern California. The dark fringes on

both wings are interrupted by white in three places, one near apices, again in the middle, and near inner angles, but these interruptions are shown on the plate rather indistinctly.

303. *Calephelis Nemesis*.

PLATE XXVII; Figures 303, Female; c, Female, underside.

Lighter in color than *Australis*, especially on the under side, and about the same size, or a little larger, but you may find some specimens which you are unable to satisfactorily assign to either name. The white breaks in the dark fringes of *Australis* are not so apparent in *Nemesis*, but the dark fringe is lightened somewhat with white hairs, often along the whole margin, with nearly always at least a faint white part near inner angle of fore wing, but practically we may regard the white interruptions as obsolescent or wanting in *Nemesis*.

Genus ATLIDES.

Two tropical species, extremely high-colored and tropical-looking, only one of which comes to the West Coast. Six-footed; bodies short and stout; extremely rapid flyers. Sex-mark, a "stigma" on the fore wing, seen in the figure of the male, 306, as a black spot on fore wing.

304. *Atlides Crysalus*.

PLATE XXVII; Figure 304, Male, underside, from Colorado; D. Bruce.

Crysalus is a gorgeous, handsome butterfly; I have shown the underside, as that is more distinctive than the upper. It is from Colorado, and is said to fly also in Utah, Arizona, and is credited to Southern California, but this latter locality is an error, being merely guesswork, as I believe.

Citima, a variety, is set down for Arizona, and if correctly so assigned, is an inhabitant of the West Coast; but I doubt the statement, and think that it is not seen west of the continental divide.

306. *Atlides Halesus*.

PLATE XXVII; Figure 306, Male, Slover Mountain, Cal., 1890; Author.

This is one of the handsomest of butterflies, the metallic, glistening scales fairly sparkle in the sunshine. Really, it is tropical in

its habitat, as it does not go further north than the Gulf States, where it is common, and westward to Arizona and Southern California. It is rapid and tricky in flight, but it does not go far away from the trees whereon its plant grows. When feeding on flowers it is tame and readily approached. Halesus has two tails, a thread-like one, and a broad, spatulate one that is always twisted, or turned edgewise.

The larval food-plant is mistletoe, usually found growing on cottonwood trees.

Genus THECLA.

Rather small-sized butterflies; bodies stout; six-footed; the hind wings usually terminated with thread-like tails. Flight, rapid and eccentric.

Sex-mark, the same as in the previous genus, namely, the male is marked with a "stigma" near costa, in the middle of the wing, the female has no such mark, but the abdomen of the female is larger, usually noticeably so.

308. *Thecla Melinus*.

PLATE XXVII; Figures 308, Male; b, Female.

This is a very common species all over the United States, and is known in some places as *Thecla Humuli*. In the Eastern States it is said to feed on the common hop-vine, the caterpillars being called "green, downy caterpillars"; but in California the eggs are oviposited on the flower-buds of *Malva rotundifolia*. As I have taken this butterfly in desert localities, where there are no hop-vines nor malva plants within many miles, I am sure that the larvae are rather omnivorous, and feed on many different plants.

309. *Thecla Californica*. Not elsewhere illustrated.

PLATE XXVII; Figures 309, a.

Fig. 309, Male, Central California, no data; from Prof. Rivers.

a, Male, underside, Sisson, Cal., 1898; Author.

This is a northern species, inhabiting the mountainous parts of Central and Northern California. The colors are rather neutral, and the key to the species is the small fulvous spot on upper side at anal angle and the blue spot with differently colored lunules on either side on the under side of the wing, as shown on the plate.

310. *Thecla Dryope*. Not elsewhere illustrated.

PLATE XXVII; Figures 310, b, c.

Fig. 310, Male, Greenhorn Mountains, 7,000 feet elevation, 1888; Author.

b, Female, San Bernardino Mts., May 24, 1895; Author.

c, Female, underside, San Bernardino Mts., June 22, 1896; Author.

Dryope is a very peculiarly colored *Thecla*, being somewhat of a pale mouse-color, with the disks of all wings paled, or in the female, flushed as well as paled; on under side all wings are chalky-white, with an anal lunule, as well shown on the plate. Dryope is a very rare species, and it is quite a feat to capture one of them, not that they are wary, but that you may walk a thousand miles without seeing one to try your net at.

311. *Thecla Tacita*.

PLATE XXVII; Figures 311, b, c.

Fig. 311, Male, Lake County, Cal., June, 1894; Author.

b, Female, Greenhorn Mountains, June, 1888; Author.

c, Female, underside, Greenhorn Mountains, June, 1888; Author.

Tacita is allied to *Dryope*, being smaller, and darker in color, but the flushings on the wings are at the inner angles, and not on the disks, as in *Dryope*. The figures give a good illustration of the species better than many words could do. *Tacita* is a mountain flyer, very widely scattered, and not plenty at any place.

313. *Thecla Auretorum*.

No figure.

This is one of the few Californian butterflies which I know nothing about. It has never been figured, and the literature about it is scanty. Apparently little is known about it.

314. *Thecla Grunus*.

PLATE XXVII; Figures 314, a.

Fig. 314, Female, San Bernardino Mts., 3,000 feet altitude, June, 1886; Author.

a, Male, underside, Sisson, Cal., July, 1892; Author.

Grunus is the third, and the palest of the group to which it belongs, the other two being *Dryope* and *Tacita*; I have grouped

them all here together for convenience of comparison. The cheeks of Grunus are flushed, like those of Dryope, and in other aspects it carries the same face as the other two, but on underside there are no markings whatever, all the dots usually seen are paled out entirely.

316. *Thecla Sæpium*.

PLATE XXVII; Figures 316, c.

Fig. 316, Male, Truckee, Cal., July, 1892; Author.

c, Male, underside, Truckee, Cal., July, 1892;
Author.

Brown above; black-brown beneath, with a small ashy-blue spot at anal angle of hind wing, which spot is the best key to the species; there are other species that resemble *Sæpium*, but the blue spot is distinctive; it is not well shown in the figure, being overshadowed by the black at that point.

318. *Thecla Chalcis*.

PLATE XXVII; Figures 318, a.

Fig. 318, Male, Greenhorn Mountains, Cal., July, 1888;
Author.

a, Male, underside, San Bernardino Mts., June,
1889; Author.

On upper side wine-red, with a dark violet luster when fresh; on under side much as in *Sæpium*, yet different, especially as the blue spot of *Sæpium* is absent in *Chalcis*; the whole under side is of a peculiar smoky tint, or in the female, bronzy. *Chalcis* is a mountain species, and is not found on the lowlands at any place; apparently about 5,000 feet elevation is where it most abounds.

319. *Thecla Nelsoni*.

PLATE XXVII; Figures 319, a.

Fig. 319, Male, San Bernardino Mountains, June, 1897;
Author.

a, Male, underside, San Bernardino Mountains,
June, 1889; Author.

This is a rare species, not being often seen. It flies on the high mountains at 5,000 to 6,000 feet elevation. The under side is peculiar in that it has a curved row of spots on the fore wing, a feature that belongs more usually to the *Lycænas* than to the *Theclas*.

320. *Thecla Exoleta*. Not elsewhere illustrated.

PLATE XXVII; Figure 320, Female, Central California, 1894; Author.

Exoleta is supposed to be a variety of the preceding, *Nelsoni*, being practically the same on the upper side, and with but minor points of difference on the under side. I figure the under side because it is there that the differences, such as they are, are located. Because the curved row of dots on fore wing is absent I am of the opinion that it is separate and distinct from *Nelsoni*.

321. *Thecla Muiri*. Not elsewhere illustrated.

PLATE XXVII; Figure 321, Male, Central California, 1897; Author.

Muiri is a variety of 319, *Nelsoni*; much smaller, and the spots of under side in good part faint or absent. On the upper side there is no difference apparent except in size.

322. *Thecla Spinetorum*.

PLATE XXVII; Figures 322, b, c.

Fig. 322, Male, Ellensburg, Wash., May 20, 1896; Author.
b, Female, Ellensburg, Wash., May 20, 1896;
Author.

c, Male, underside, Ellensburg, Wash., May 20, 1896; Author.

This is a member of the group to which the preceding *Nelsoni* and *Muiri* belong, being very similar, and having on the under side the same type of markings, including the discal bar or series of dots on fore wing; the markings of hind wing are of *Nelsoni* type, and are more distinct and obvious than in *Nelsoni*, or *Muiri*.

323. *Thecla Spadix*. Not elsewhere illustrated.

PLATE XXVII; Figures 323, a.

Fig. 323, Female, Central California Mts., August 5, 1890; Author.

a, Male, underside, Central California Mts., August 5, 1890; Author.

Spadix is very plain dull mouse-color, on both upper and under side with scarcely a line or a mark for ornamentation. The female sometimes has a faint chestnut shade on the disk of wings, but often has not. It is a rather large-sized butterfly, and lives in the mountains, at an elevation of about 4,000 feet.



324. Thecla Adenostomatis.

PLATE XXVII; Figures 324, b.

Fig. 324, Male, Central California, no data.

b, Female, underside, Central California, no data.

On upper side this butterfly is very much like the preceding, being plain mouse-color, and without any marks for identification; but, like many others, the under side is different, having a thin, hoary whiteness overspread, and the median band is apparent as a thin white line, merely, across both wings, together with some small marks at anal angle of hind wing.

326. Thecla Clytie.

No figure.

Clytie is now thought to be the same as Ines. The differences, if any, are that Clytie is a little larger in size, and the blue of hind wing extends over the hind part of the fore wing.

327. Thecla Ines.

PLATE XXVIII; Figures 327, b, c.

Fig. 327, Male, Santa Rita Mts., Arizona, Oct., 1892;

F. Stephens.

b, Female, Santa Rita Mts., Arizona, Oct., 1892;

F. Stephens.

c, Female, underside, Southern California, Oct., 1903; Author.

This beautiful little Thecla comes from Arizona and from that part of California adjoining. It is very rare, and not often found in collections, perhaps because of its habit of appearing in the autumn rather than in the spring, as is usual with most butterflies. In Arizona they have summer rains, which cause the plants to enjoy a sort of second spring, and that would seem to offer a sort of reason for the fall appearance of this butterfly, but in California, adjoining, there is no summer rain, and yet Ines comes out at the same time as in Arizona.

328. Thecla Avalona, n. s. Not illustrated elsewhere.

PLATE XXVIII; Figures 328, b, c.

Fig. 328, Male, Catalina Island, summer of 1885; F. Stephens.

b, Female, Catalina Island, summer of 1885; F. Stephens.

c, Male, underside, Catalina Island, summer of 1885; F. Stephens.

Expanse, .8 to 1 inch. Male, blue; female, dusky-blue; small black and faint fulvous lunules at anal angle. Under side ashy-blue, dusky at apices; a median band across both wings, deeply indented twice on each wing, the band is somewhat after the pattern of the band on Behri, on which account I have placed Avalona next to Behri on the plate.

It is a matter of great grief to me that the males of these figures were in a wretched condition, so rubbed as to be almost valueless, but I had no others. This charming new species was taken on Catalina Island in 1885, as noted on the data, and I have named it for the chief town on the island, near which the specimens were taken. It might well have been named for Mr. Stephens, but neither Mr. Stephens nor the Author favors personal names. This new species was recognized as new long ago, but has been held in abeyance till now that it might appear in this book.

329. *Thecla Behri*.

PLATE XXVIII; Figures 329, b, c.

Fig. 329, Male, Truckee, Cal., July, 1901; Author.

b, Female, Truckee, Cal., July, 1901; Author.

c, Female, underside, Truckee, Cal., July, 1901; Author.

Behri is a lovely little butterfly, and in the Tahoe region and along the Truckee River it is very abundant indeed. It is set down for several of the States of the Great Basin, and as far north as Oregon, so it is probable that it flies in every State of the Basin north of Arizona.

330. *Thecla Iroides*.

PLATE XXVIII; Figures 330, b, c.

Fig. 330, Male, Southern California, April, 1895; Author.

b, Female, Greenhorn Mountains, 7,000 feet altitude, 1888; Author.

c, Female, underside, Greenhorn Mountains, 7,000 feet altitude, 1888; Author.

Iroides is very common in Southern California in early spring; it likes to feed on the flowers of the early-flowering ceanothus. This species enjoys a wider range in altitude than most butterflies, as it flies on the plains, and up to an elevation of 8,000 feet; and it also reaches over the whole of the West Coast, from Arizona to Vancouver Island, and perhaps still further north.

*palios***331. *Thecla* (Mossi.)** Not figured elsewhere.

PLATE XXVIII; Figure 331, Female, underside, Puget Sound, May 1, 1890; Author.

Mossi is sometimes spoken of as the Western form or representative of the Eastern species, *Irus*, which lives in the Atlantic and the Western States. Mossi was taken on Vancouver Island in 1880, and ten years later this figured example was taken by me in the same region. Between this locality and the habitat of *Irus* in the Western States is a vacant space two thousand miles wide, in which neither *Irus* nor Mossi are seen, and, considering this fact, and also the differences between the forms, I conclude that Mossi is a good and sufficient species.

The essential peculiarity of Mossi is the bleached, washed-out appearance of the underside of hind wings, "giving it a most peculiar aspect," as the description truly says, and as shown on the plate.

333. *Thecla* Eryphon.

PLATE XXVIII; Figures 333, b, c.

Fig. 333, Male, Sierra Nevadas near Lake Tahoe, July, 1892; Author.

b, Female, Sierra Nevadas near Lake Tahoe, July, 1892; Author.

c, Female, underside, Sierra Nevadas near Lake Tahoe, July, 1892; Author.

The key to this species is the evenly-curved band near the middle of fore wing, in contradistinction with the next species, *Niphon*, in which the band is sharply angled or dentated; though the underside of *Niphon* is much lighter than *Eryphon*.

334. *Thecla* Niphon.

PLATE XXVIII; Figures 334, b, c.

Fig. 334, Male, Mendocino County, Cal., June, 1891; Author.

b, Female, Mendocino County, Cal., June, 1891; Author.

c, Female, underside, Mendocino County, Cal., June, 1891; Author.

Niphon is much like the preceding *Eryphon*, being lighter, especially on under side, and the banding beneath is more angulated.

335. *Thecla Dumetorum*.

PLATE XXVIII; Figures 335, a, aa.

Fig. 335, Male, Southern California, May, 1903; Author.

b, Male, Central Montana, July, 1892; Author.

a, Male, Truckee, Cal., July, 1891; Author.

Figure 335 is the typically colored male of the West Coast, and Figure *b* following is of an example taken in the extreme eastern part of its range, and shows much bronze-color; Figure *a* is an average specimen, showing the white dots crossing the wing; sometimes these dots are on both wings, or on either. These white dots are the line of separation between *Dumetorum* and the following, *Affinis*.

336. *Thecla Affinis*.

PLATE XXVIII; Figures 336, b.

Fig. 336, Male, Southern California, 1890; Author.

b, Female, Southern California, 1895; Author.

Affinis is a variety of *Dumetorum*, in which there are no white dots on either wing on under side. There are but few examples that are fully and fairly marked with the dots across either wing, most specimens have one or more dots on one of the wings, but in that case they are a sort of intergrades, belonging to neither form.

337. *Thecla Apama*.

No figure.

Apama is an Arizona species resembling *Dumetorum*, on under side greenish in color, and having a more elaborate ornamentation. It is properly a Mexican species, only in limited numbers coming across the line.

Genus *CHRYSOPHANUS*.

A group of sixteen species belonging to the West Coast, larger than the *Theclas* or the *Lycænas*, and of apparently intermediate structure; generally reddish males and yellowish females, freckled above and beneath with black spots, and figured with colored lines and lunules. At one time these were considered as *Lycænas*, and were listed with them.

338. *Chrysophanus Arota*.

PLATE XXVIII; Figures 338, b, c.

Fig. 338, Male, Santa Clara County, Cal., July, 1892;
Author.b, Female, Santa Clara County, Cal., July, 1892;
Author.c, Female, underside, Santa Clara County, Cal.,
July, 1892; Author.

This was one of the first butterflies of the West Coast to be named; it flies in the vicinity of San Francisco Bay, and so early fell into the hands of the French collector during the first gold fever, and sent to France, where it was named by Boisduval. *Arota* and the next, *Virginiensis*, are much alike, and will puzzle to separate if the locality labels are missing; I have a good series of both, but find no feature that can be relied on in all cases, as each character seems comparative, only.

339. *Chrysophanus Virginiensis*.

PLATE XXVIII; Figures 339, b, c.

Fig. 339, Male, Sierra Nevadas of California, July, 1892;
Author.b, Female, Madeleine Plains, Cal., July, 1894; F.
Stephens.c, Female, underside, Portland, Oregon, August,
1890; Author.

This is a mountain butterfly, seen only at high elevations, except at the north, where nothing counts as elevation. The example *b* above, is the darkest one I have, showing less white on hind wing; others taken south in California have nearly as much white beneath as *Arota*.

340. *Chrysophanus Hermes*.

No figure.

I have never been able to distinguish this species. The description is as follows: "Size, about one inch; sexes much alike; upper side, pale fulvous; margin brown; an irregular row of brown discal spots. Under side, fore wings pale buff, spots large and distinct; hind wings base grayish, margin clouded gray; a row of discal black spots; at anal angle a black spot, and near it others obsolete; a long, tapering tail."

341. *Chrysophanus Mariposa*.

PLATE XXVIII; Figures 341, b.

Fig. 341, Male, Sierras of Central California, July, 1892;

Author.

b, Female, Sierras of Central California, July, 1892;

Author.

Mariposa is a small-sized butterfly, for one of this genus, and it has no sign of a tail, so that, although it looks much like others in point of color and markings, it is readily separated. It is a mountain species, and I have found it to be quite rare everywhere.

342. *Chrysophanus Xanthoides*.

PLATE XXVIII; Figures 342, b, c.

Fig. 342, Male, Southern California plains, June, 1895;

Author.

b, Female, Southern California plains, June, 1895;

Author.

c, Female, underside, Greenhorn Mountains, July, 1888; Author.

This is the largest *Chrysophanus* of the West Coast. It is generally a plains species, though later in the season it can be found well up on the hills and mountains of moderate height. It is quite easy to confuse the females of this and the next, Gorgon, but if you note the lines and dots at the anal angle on the under side of hind wing, you will not get them mixed.

343. *Chrysophanus Gorgon*.

PLATE XXVIII; Figures 343, b, c.

Fig. 343, Male, Riche Canyon, S. Cal., June, 1899; Author.

b, Female, Cabazon, Southern California, 1898; Author.

c, Female, underside, Mendocino County, Cal., June, 1894; Author.

Gorgon, the male, in the south is a fiery-red fellow, looking like red-hot iron glossed with violet. More to the north the color is subdued. The female Gorgon is tinted with coffee-color on the under side of both wings, and all the submarginal dots and lunules are separate, and not tied together with white lines, or lines of any color.

345. Chrysophanus Editha.

PLATE XXVIII; Figures 345, b, c.

Fig. 345, Male, Truckee, Cal., June 20, 1892; Author.

b, Female, Truckee, Cal., June 22, 1892; Author.

c, Female, underside, Tahoe, Cal., June, 1892;
Author.

Editha inhabits the plains and valleys some thousand feet below the crests of the higher mountains, and is very common everywhere in suitable locations.

346. Chrysophanus Zeroe.

PLATE XXVIII; Figures 346, b, c.

Fig. 346, Male, Portland, Oregon, July, 1890; Author.

b, Female, Sierra Nevadas of California, July, 1892;
Author.c, Female, underside, Sierra Nevadas of California,
July, 1892; Author.

This is a similar species to the preceding, and found in similar environment, but extending further to the north, into Oregon, and perhaps into Washington, but I have never taken it that far north. The key to Zeroe is the white, blank, underside of hind wing, which is peculiar to this species alone.

347. Chrysophanus Del Sud, n. s. Not illustrated elsewhere.

PLATE XXVIII; Figures 347, b.

Fig. 347, Female, San Diego, Cal., 1896.

b, Female, underside, San Diego, Cal., 1896.

Expanse, 1.1 inch; color of the female, upper side brownish, with pale orange on fore wing near inner angle, and black spots, as in Arota, but less prominent; hind wing without spots, except a line of reddish at anal angle; a small tail; under side yellow on both wings, the fore wing whitish on the disk, with five black spots irregularly placed; no spots on hind wing, except two minute ones inside the middle.

This fine and peculiarly-marked Chrysophanus was taken near San Diego by Mr. Carl Field, and given to Mr. F. Stephens, who sent it to me for determination. No male was taken; I have done what I could in the years since this example came into my possession to get a male of the species, but without avail. Del Sud (of the South) is probably a Lower California butterfly, just hap-

pening over the line; in that case it ought to be taken at Yuma, evidently.

348. *Chrysophanus Helloides*.

PLATE XXVIII; Figures 348, b, c.

Fig. 348, Male, Southern California, 1900; Author.

b, Female, Vancouver Island, 1892; Author.

c, Portland, Oregon, 1892; Author.

This is very common and wide-spread, and everybody knows it if they know any of the smaller butterflies.

The larval food-plant is *Polygonum aviculare*, common "knot-grass."

349. *Chrysophanus Dorcas*. Not elsewhere illustrated.

PLATE XXVIII; Figures 349, b, c.

Fig. 349, Male, Sitka, Alaska, July, 1891; Author.

b, Female, Sitka, Alaska, July, 1891; Author.

c, Female, underside, Sitka, Alaska, July, 1891; Author.

Dorcas I consider to be a far northern variety or form of *Helloides*; smaller, and much darker, as becomes it in that northern habitat, but all the ear-marks show it to be the same thing. It is rather common about Sitka, especially out near the lake that supplied the old Russian saw-mill with water; there it was seen flitting about over the deep moss that covered the meadow, but it was difficult to see or to take, because so dusky, and so concolorous with the moss.

351. *Chrysophanus Cupreus*. Not illustrated elsewhere accessibly.

PLATE XXVIII; Figures 351, b, c.

Fig. 351, Male, Sierra Nevadas of California, July, 1892; Author.

b, Female, Colorado, no data; D. Bruce.

c, Female, underside, Sierra Nevadas; Author.

This gorgeous little butterfly is quite a rare thing; it is noted in the books as taken only in two localities, at Mt. Shasta, and in Oregon. I never saw it at Shasta, although I have hunted there a good deal; indeed, I have taken only three or four anywhere.



352. Chrysophanus Rubidus.

PLATE XXVIII; Figures 352, b, c.

Fig. 352, Male, no data.

b, Female, no data.

c, Female, underside, no data.

The male on upper side is very like Cupreus, though larger, and the female is darker than the female of Cupreus, a peculiar white-and-dusky color, without much red or yellow. It is set down in the books as living in Oregon, Nevada and Montana, but all I can say about that is that I have not ever seen one in any one of those States.

353. Chrysophanus Sirius.

PLATE XXVIII; Figures 353, b.

Fig. 353, Male, from Western Colorado; D. Bruce.

b, Female, from Western Colorado; D. Bruce.

Sirius is said to inhabit some of the States of the Great Basin, from Arizona to British America; it ought to be found in Eastern Oregon and Washington, east of the Cascades, but I have not heard of any such habitat having been established.

Genus LYCÆNA.

A large genus, of world-wide distribution. "The Blues" are everywhere, in the springtime, on plain and on mountain alike, for generally these little butterflies are in flight in the spring only, although several are summer and autumn-flying species, so that we have them with us at all times except during the cold months.

All Lycænas have the peculiar habit when at rest or when feeding on flowers, of rubbing their wings up and down with a gentle motion, which reminds us of the way flies have of rubbing their feet together; the wings do not touch together, nor do they rub against anything else, and it is unknown what the object of the motion may be. If from any cause the butterfly becomes disturbed, it at once stops the motion until the distrust is removed. All Theclas also have the same habit.

The eggs of all Lycænas are nearly globular, greenish-white, the egg itself being green, but covered with a white network or film which can be peeled off.

Some *Lycæna* larvæ have a strange habit of feeding in seclusion by hiding away, as in a pea-pod, and of spinning a web to close over the aperture by which they entered, so that no other thing can enter. In this queer, moth-like habit of feeding, *Amyntula*, *Sonorensis*, and *Hanno* have been identified by the Author, and probably many other species have the same habit, as the *Lycænas* are fond of plants of the leguminous order, laying their eggs on the flower-buds, generally.

354. *Lycæna Fuliginosa*.

PLATE XXIX; Figures 354, b.

Fig. 354, Male, Peters' Valley, N. E. Cal., July 10, 1894; Stephens.

b, Female, underside, Peters' Valley, N. E. Cal., July 10, 1894; Stephens.

Smoky-black on upper side, and smoky-brown beneath; it is a very odd-looking butterfly; it should have been named "indefinita," for that is the most appropriate name.

355. *Lycæna Heteronea*.

PLATE XXIX; Figures 355, b, c.

Fig. 355, Male, Lake Tahoe Basin, July 8, 1896; Author.

b, Female, Lake Tahoe Basin, July 8, 1896; Author.

c, Female, underside, Mendocino County, 1885; J. Behrens.

This is a beautiful, large-sized *Lycæna*, perhaps as large as any on the West Coast. The upper side of the male is a bright, glossy blue, with a shining, dewy appearance, and the veins all stand out visibly. The female is brown, overlaid with blue. The under side of both sexes is covered with long white hairs, which sometimes obscure the black spots.

356. *Lycæna Clara*.

PLATE XXIX; Figures 356, c.

Fig. 356, Male Tehachapi Mountains, Aug. 5, 1890; Author.

c, Female, underside, Tehachapi Mountains, Aug. 5, 1890; Author.

Clara has very thin and transparent wings, so that the spots of under side show through on the upper. The wings are dusky, thinly overlaid with blue scales; the male more blue than the

female. The under side is sordid white, and the dots on hind wing are scarcely visible.

357. *Lycæna Lycea*.

PLATE XXIX; Figures 357, b.

Fig. 357, Male, Colorado; T. L. Mead.

b, Female, underside; T. L. Mead.

Lycea is readily distinguished by the very large black spots on under side of fore wing, all spots of both wings being heavily irised with white. So far as I know, no example of *Lycea* was ever taken in any Coast State, but it inhabits the States of the Great Basin, from Arizona to Montana, and doubtless flies up to the eastern base of the Sierra Nevada Mountains, and thus comes well within our territory, and should be found along the eastern base of the mountains to Eastern Oregon and Washington.

358. *Lycæna Fulla*.

PLATE XXIX; Figures 358, b, c.

Fig. 358, Male, Sierra Nevadas, 7,000 feet elevation, July, 1896; Author.

b, Female, Sierra Nevadas, 7,000 feet elevation, July, 1896; Author.

c, Female, underside, Sierra Nevadas, 7,000 feet elevation, July, 1896; Author.

Fulla is a rare mountain butterfly from the high Sierras of California. The male is dusky, thinly glossed over with blue, and the female is still more thinly glossed over; the under side of both wings is chalky-white, with large black dots on the fore wings, but it would be impossible for a trained eye to confuse this with the preceding.

359. *Lycæna Pheres*.

PLATE XXIX; Figures 359, b, c.

Fig. 359, Male, Goldstream, Vancouver Island, July 6, 1892; Author.

b, Female, Goldstream, Vancouver Island, July 6, 1892; Author.

c, Female, underside, Goldstream, Vancouver Island, July 6, 1892; Author.

This is a northern butterfly, from near the Canada line; I have taken it at Spokane and on Vancouver Island, and it is said to fly in many of the States of the Great Basin as far south as Colo-

rado, on the heights of the Rocky Mountains. *Pheres* is a little less blue than *Fulla*, so that on the female there is no blue to be seen, except close toward the body; and on under side the white is sordid, and the spots are very small.

360. *Lycæna Icaroides*.

PLATE XXIX; Figures 360, b, c.

Fig. 360, Male, Lake County, Cal., May 29, 1894; Author.

b, Female, Emigrant Gap, June 30, 1892; Author.

c, Female, underside, Mendocino County, Cal., June, 1889; Author.

Icaroides is one of the oldest names, having been taken in the days of the first gold excitement, and named in 1852. It is very wide-spread, and is captured by every butterfly hunter, and everybody prints something about it, and it is often mixed up with some other species; but that was before the days of photographic color-printing. With these plates before you there will be no occasion for mistake.

361. *Lycæna Dædalus*.

PLATE XXIX; Figures 361, b, c.

Fig. 361, Male, Emigrant Gap, California, June 28, 1892; Author.

b, Female, San Bernardino Mountains, June 10, 1889; Author.

c, Female, underside, Mount Shasta, Cal., June, 1890; Author.

Dædalus has had troubles of its own, having been called *Icaroides*, *Æhaja*, *Rufescens*, and *Sæpiolus*, till the poor thing might well have become discouraged in trying to maintain a separate individuality. The male is bright pruinose-blue, with wide dusky margin, and white under side; the female is red-brown, often with a bronze flush on hind wings, and beneath is of dark coffee-color; both sexes with two parallel rows of marginal points on hind wing, with many other points on both wings, all of them being large and positive.

362. *Lycæna Maricopa*.

No figure.

With this species I am not acquainted under that name. The description reads: "Brown, glossed violet; beneath, ash-brown, on fore wing a median sinuate row of seven large spots; hind wing,

three transverse maculate bands, the inner one of eight large round black spots bent twice at right angles; the second, of smaller, and sagittiform, and running parallel with border; the third, marginal, indistinct; all irised white." And that description applies fairly to the next species, *Sæpiolus*; therefore I believe that there is no *Maricopa*, and as the name was applied fourteen years after *Sæpiolus* was named, it therefore must be dropped.

363. *Lycæna Sæpiolus*.

PLATE XXIX; Figures 363, b, c.

Fig. 363, Male, Lake County, California, June 19, 1894;
Author.

b, Female, Emigrant Gap, Cal., June, 1892; Author.

c, Female, underside, Emigrant Gap, Cal., June,
1892; Author.

Silvery-blue, a size smaller than the preceding, being somewhat similar as to many points, yet so well shown on the plate that no one could well be mistaken as to the species.

365. *Lycæna Kodiak*. Not elsewhere illustrated.

PLATE XXIX; Figures 365, b, c.

Fig. 365, Male, Juneau, Alaska, June 10, 1891; Author.

b, Female, Juneau, Alaska, June 10, 1891; Author.

c Female, underside, Juneau, Alaska, June 10, 1891;
Author.

Small size, about one inch expanse; male, blue of a deep violet tint; female, brown with more or less blue at base. No lunules on hind wing on either sex. Beneath, male, grayish with obscure yellowish lunules on hind wing; female, dull brownish, yellowish obscure lunules at margin of all wings, becoming obsolete at apices.

Only a few of these were taken in the canyon above town, and alongside of the river of glacial water that comes tumbling down in such a haste that it is a continual cascade.

367. *Lycæna Antiacis*.

PLATE XXIX; Figures 367, b, c.

Fig. 367, Male, Southern California, May 20, 1895;
Author.

b, Female, Southern California, March 10, 1893;
Author.

c, Female, underside, Southern California, June 1,
1896; Author.

This is one of the most abundant "blues" in California in the spring. It is of a lustrous, dewy blue, with visible veins, as in *Heteronea*. It is a valley species, not going into the mountains.

The larval food-plant is *Lupinus*, of several species.

368. *Lycæna Behri*. Not elsewhere illustrated.

PLATE XXIX; Figure 368, Female, underside, Spokane, May 16, 1890; Author.

The distinctive points of *Behri* are on the underside, so I have figured the female, which shows the variation better than the male. The figure shows all the spots of under side about the same size, and ringed with white. *Behri* I suppose to be the northern representative of the southern *Antiacis*, darker every way, and all spots more prominently irised with white.

369. *Lycæna Mertila*. Not elsewhere illustrated.

PLATE XXIX; Figure 369, Male, underside, San Francisco, 1890; C. E. Cottle.

Mertila is a variety of *Antiacis*, with all the round dots on under side half covered with the white iris which surrounds them. This variety seems to be quite local.

370. *Lycæna Xerces*.

PLATE XXIX; Figures 370, b, c.

Fig. 370, Male, San Francisco, 1890; C. E. Cottle.

b, Female, San Francisco, 1890; C. E. Cottle.

c, Female, underside, San Francisco, 1890; C. E. Cottle.

In this species the peculiarities of *Mertila* are still more evident; the black margin is wider, and on under side the spots are all completely covered over with the white iris, so that they look like white spots. This beautiful butterfly was lost for thirty years, and was believed to be extinct, but of late years it has reappeared in the same locality where it formerly was so common, namely, Lone Mountain Cemetery, near San Francisco, and it is said that it is becoming quite plentiful in that locality, though unknown in any other place.

371. *Lycæna Orcus*.

No figure.

Orcus I suppose to be the same as *Mertila*. It is said to be from Central California, having the same habitat as *Mertila*, and from all I can learn is the same form.

372. *Lycæna Oro.*

No figure.

This is said to be the Western form of the Eastern *Lygdamus*, a species which flies from Michigan to Georgia. *Lygdamus* is peculiar in having one row of spots of same size on both fore and hind wings, as is shown in the Figure 368, on this plate. From what I know of it and of *Oro*, *Oro* is the same as *Behri*, illustrated in Figure 368.

373. *Lycæna Sagittigera.*

PLATE XXIX; Figures 373, b, c.

Fig. 373, Male, Spokane, Washington, May 10, 1890;
Author.

b, Female, Southern California, May 30, 1902;
Author.

c, Female, underside, Spokane, Wash., May 10,
1890; Author.

This elegant butterfly is so peculiarly marked that it cannot be mistaken for any other. It is very wide-spread, but is larger and finer at the north than at the south.

The plant used to oviposit eggs upon is *Lupinus*. The eggs are put upon the flower-buds, and doubtless the larvæ feed on the immature seeds.

374. *Lycæna Sonorensis.*

PLATE XXIX; Figures 374, b, a.

Fig. 374, Male, Southern California, May, 1890; Author.

b, Female, Southern California, May, 1890;
Author.

a, Male, underside, Southern California, May, 1890;
Author.

This lovely little *Lycæna* is noted as being the most exquisite "blue" that flies in America. I have taken it on the peninsula of Lower California, where it is more plentiful than in any other locality; in the State of California it flies as far north as Gilroy, and to Yosemite, in the mountains. It is not abundant in any locality except that it was plenty enough in Lower California.

The eggs are oviposited on the leaves of cotyledon, and when the larvæ are hatched they eat their way into the interior of the thick leaves and burrow therein until mature, when they come out to

pupate in rubbish on the ground. I have had several years' experience in breeding them.

375. *Lycæna Podarce*.

PLATE XXIX; Figures 375, c.

Fig. 375, Male, Emigrant Gap, July 22, 1892; Author.

c, Female, underside, Pendleton, Oregon, July, 1890; Author.

Podarce is a mountain butterfly, found at 6,000 to 8,000 feet elevation in the Sierras of Central California. It appears not to go far north, but it goes east to the Rocky Mountains of Colorado. Podarce is a dusky damsel with wide dusky borders to both wings, the disk being lightly blued. The hind wings show a marginal series of lunules, each one surrounded with pale blue. The veins are emphasized by a narrow line of dusky scales. On under side, ashy-grayish, all spots small and indefinite, and placed angularly, after the *Piasus* pattern.

376. *Lycæna Enoptes*.

PLATE XXIX; Figures 376, b, c.

Fig. 376, Male, San Bernardino Mountains, 3,000 feet altitude, June, 1890; Author.

b, Female, Mt. Hood, Oregon, July 20, 1892; Author.

c, Female, underside, Mt. Hood, Oregon, July 20, 1892; Author.

The male is blue with a violet luster; no orange lunules on hind wing. Female brownish, glossed on disk with blue, with five round black spots and an inner row of orange lunules connected in a band and only cut by the nervures. Beneath, both sexes are grayish.

Enoptes is a mountain flyer, and, as noted above, is wide-spread, but always in the mountains, and never in the valleys.

377. *Lycæna Battoides*.

No figure.

Battoides is same size as *Enoptes*, blue, and has two black dots at hind margin of hind wings, the dots supported inside by bright orange, and with two tail-like projections; the distinct colors and the tails lend a sort of *Thecla*-like aspect to the butterfly.

378. *Lycæna Shasta*.

PLATE XXIX; Figures 378, b, c.

Fig. 378, Male, Lake Tahoe Basin, July 12, 1891; Author.

b, Female, Lake County, Cal., July, 1894; Author.

c, Female, underside, Mt. Shasta, Cal., 1892;
Author.

Larger than the preceding, and the female has much less orange on the margin of hind wing. A wide-spread, mountain butterfly, found from Central California to Oregon and Washington.

379. *Lycæna Melissa*.

PLATE XXIX; Figures 379, b, c.

Fig. 379, Male, Greenhorn Mountains, 7,000 feet altitude,
July, 1888; Author.

b, Female, San Bernardino Valley, 1895; Author.

c, Female, underside, Mojave Desert, 3,000 feet
altitude, Aug. 12, 1887; Author.

This well-known and handsome species is wide-spread, flying in valleys, on mountains, and in deserts, wherever it pleases to go. The species ranges from Arizona to British America, and from California to the Rocky Mountains.

The larval food-plant is *Hosackia*, and doubtless other leguminous plants.

380. *Lycæna Acmon*.

PLATE XXIX; Figures 380, b, c.

Fig. 380, Male, San Bernardino Valley, 1890; Author.

b, Female, Spokane, Wash., May, 1892; Author.

c, Female, underside, no data.

Acmon is a universal species, and ranges over the whole country. The food-plant is *Hosackia*. Probably other leguminous plants, as well. The female *Acmon* is liable to variations, in different localities.

381. *Lycæna Chlorina*. Not elsewhere figured.PLATE XXIX; Figure 381, Female, Tehachapi (?), 1890(?),
Author.

Chlorina was described in 1892, from apparently one female, the sex being noted, but nothing whatever is said about the male, wherefore we must conclude that at that time the male was unknown. In March, 1905, before this book was published, I sub-

mitted a copy of this figure to the Author of Chlorina, asking if it was Chlorina, and he replied, "It may represent the female of Chlorina, but I can't be sure, as my three specimens are males." I myself have never seen the male of Chlorina, although I have hunted butterflies in the typical habitat many seasons. Indeed, from the description of Chlorina, as printed in Ent. News, Jan., 1892, I had always supposed that Chlorina was a variant female of Acmon, but now that the male is found, it must be a full species.

381a. *Lycæna Neurona*.

No figure.

Neurona is described from several female specimens, the male not being mentioned. The fore wings black, "with the nerves of the wings orange, terminating in swellings or slight expansions parallel to the outer margin;" the hind wings black, with an orange border, in which are five small black dots parallel to the margin, and the nerves toward base are orange for a short distance.

This appears to be a variant female Acmon. I am well acquainted with the type locality; it is a high mountain valley, 6,500 feet in altitude, the northern and eastern sides being bordered by the Mojave Desert. But few forms of butterfly life are present there, but the few which do occur may well be variations of one kind or another. The locality is Doble, at the upper end of Bear Valley, in San Bernardino County, Cal.; the grassy valley is surrounded with pine-clad mountains.

382. *Lycæna Melimona*, n. v. Not elsewhere illustrated.

PLATE XXIX; Figures 382, b, c, cc.

Fig. 382, Female, San Bernardino Mts., June, 1886;
Author.

b, Female, San Bernardino Mts., June, 1895;
Author.

c, Female, underside, San Bernardino Mts., June,
1895; Author.

cc, Female, underside, San Bernardino Mts., June,
1889; Author.

I give four figures of a new form of variant female of Acmon, over which I have puzzled many years; at first I thought it a hybrid of Melissa and Acmon, and so gave it a name from both of the supposed parents, but later I came to see that it is only a

variant female. I find it every year at one spot, Acmon prevailing in May, Melimona in June, and in July only Melissa is seen. In 1887 I sent some specimens to W. H. Edwards, and he said it was "only a variety of Acmon." The locality of Melimona is a little open mesa on the southern slope of the mountain, at an altitude of 3,500 feet, and there I find it every year in June, but at no other time. There is no male Melimona.

The larval food-plant is *Hosackia purshiana*, a slender, procumbent species, which grows among the grass in damp places.

383. *Lycæna Lotis*. Not elsewhere illustrated.

PLATE XXIX; Figures 383, b, c.

Fig. 383, Male, Mendocino County, Cal., 1887; from James Behrens.

b, Female, Blue Lakes, Cal., May, 1894; Author.

c, Male, underside, Mendocino County, June, 1887; Behrens.

This is one of the rare butterflies of California, so rare that these figures show all that I have obtained in twenty-five years of butterfly hunting. The male is deeply violet-blue with a changeable luster of lighter blue; the female is darker blue and without a changeable gloss. The under side of both sexes is grayish; the discal row of spots on fore and hind wings together forms the segment of a circle, if the wings are properly spread; at anal angle is a black spot split into one large and one small spot, the larger one covered with metallic blue-green scales, and above this a marginal row of yellow-brown lunules, becoming obsolete at outer angle.

384. *Lycæna Anna*.

PLATE XXIX; Figures 384, b, c.

Fig. 384, Male, Sierra Nevadas of California, July, 1892; Author.

b, Female, Sierra Nevadas of California, July, 1892; Author.

c, Female, underside, Sierra Nevadas of California, July, 1892; Author.

This is a large and showy butterfly, somewhat like Melissa in point of markings, but Anna is not so blackish, either above or beneath, and is always much larger in size. Anna is a mountain species, and rather of a northern one as well; it flies from the

mountains of Central California to far into British America, and east to the Rocky Mountains of Montana.

385. *Lycæna Amyntula*.

PLATE XXIX; Figures 385 b, c.

Fig. 385, Male, Riche Canyon, S. Cal., March 29, 1880; Author.

b, Female, Portland, Oregon, May 3, 1891; Author.

c, Female, underside, Tenino, Washington, May, 20, 1891; Author.

Amyntula is spread over all the West Coast States, from Mexico to Juneau, Alaska, and very likely still further north than Juneau, perhaps to the Arctic Circle. In the south *Amyntula* lays its eggs on the young seed-pods of *Astragalus crotolaræ*, and when the larvæ hatch, they eat their way into the pod and live there secreted till mature, if there are enough immature seeds there to suffice; if not, they come out and enter another pod and seal the aperture behind them. When mature, they come out to pupate in rubbish on the ground.

386. *Lycæna Herri*.

No figure.

This is a variety of *Amyntula*, from Arizona, differing from type in having a black margin on the wings of the male, and the female has a narrow black band instead of the usual dark area on fore wings, and on under side of both sexes the markings are all heavier than on the type.

387. *Lycæna Annetta*.

No figure.

Annetta is from Utah, and is unknown from the Coast States proper, or from any other locality than Utah; it is therefore rather a Great Basin species than a Coast States form. The male is bright lustrous blue, resembling the male of *Melissa*, and the female is lighter or paler, having around the margins of all wings a whitish appearance, and on hind wings are a series of dots similar to those seen on the hind wings of *Echo*.

388. *Lycæna Lucia*.

No figure.

Lucia is a small winter variety or varietal form of *Argiolus* which type I do not recognize on the West Coast, though four or



five varietal forms of that type are found here, as Lucia, Violaacea, Piasus, Echo, etc., the stem or type Argiolus being absent. Lucia is said to fly in Alaska and in British Columbia, but I have never seen it on the wing. The fringe is interrupted, so that the edges of all wings appear to be toothed, something like Sagittigera; and there is a dark patch in the middle of hind wings on the under side.

389. *Lycæna Violaacea.*

No figure.

Violaacea, like the preceding, Lucia, is chiefly an Eastern form of the same type, Argiolus, and is noted in the books as flying in limited numbers in Alaska, and the Provinces of Canada, and along the Rocky Mountains southward to Colorado. It is a little larger than Lucia, and resembles Piasus somewhat, but is of a lighter and more delicate violet color on upper side; and it is not so prominently toothed on the edges of the wings, from the interruptions of the fringes.

390. *Lycæna Piasus.*

PLATE XXX; Figures 390, b, c, d.

Fig. 390, Male, Juneau, Alaska, June, 1891; Author.

b, Female, San Bernardino, Cal., Jan. 31, 1901;
Author.

c, Female, underside, San Bernardino, Cal., Feb. 28,
1888; Author.

d, Bi-sexual, San Bernardino, Cal., Jan. 24, 1901;
Author.

Piasus is the earliest spring butterfly. It flies all over the West Coast, from Mexico to St. Michaels, and likely to the Arctic Ocean. The northern examples that I have taken in Alaska show no difference from those taken in the south. The spots on underside are all of them elongated, and are placed angularly on the wing, the spots are not black, simply dusky. The fourth figure, *d*, is a bi-sexual individual, the right-hand wings being female, and the left-hand ones male. This is the only bi-sexual butterfly that I have ever taken. Other examples have been figured in other works, so that other instances are not unknown, but they are very rare indeed.

391. *Lycæna Echo*. Not elsewhere illustrated.

PLATE XXX; Figure, 391, Female, Lake County, Cal.,
June, 1894; Author.

Echo is a variety of *Piasus*, showing a series of dots on outer margin of hind wings. The female only has this variation; it is not a seasonal form, but appears at any time during the flight of the species.

392. *Lycæna Arizonensis*. Not elsewhere illustrated.

PLATE XXX; Figure 392, Female, Southern Arizona, 1881;
Author.

This is another and possibly a climatic variation of *Piasus*, consisting mainly in the increased duskiess of both fore and hind wings, and, so far as my observation extends, in the presence of the Echo-like ocelli on hind wing in every instance. This form is found in the hilly or mountainous parts of southern Arizona.

393. *Lycæna Monica*.

No figure.

In 1866 a small tailed *Lycæna* from southern California was named, and later was figured by Strecker, the figure looking like a small-sized male *Amyntula*, with two small black dots on the wing just above the tail, the tail thread-like, similar to the tail of some *Thecla*. Since those early days no one has seen *Monica*, and some writers have even dropped the name from the list. I know nothing about it, and have no faith in it; I think *Monica* was a small *Amyntula*, and should be dropped. *Lycæna Tejua* is another name that has still less claim upon the list for a place therein; *Tejua* was figured on the same plate with *Monica*; it was shown as the same style as *Monica*, but with one dot on each hind wing, and very long and slender tails, longer and slenderer than any known *Lycæna* carries today. I have no faith in *Tejua*, but I mention the name simply to account for all known names and forms.

394. *Lycæna Isola*.

PLATE XXX; Figures 394, b, c.

Fig. 394. Male, Southern California, June 10, 1897;
Author.

b, Female, Tucson, Arizona, June 3, 1903;
F. Stephens.

c, Female, underside, Southern California, June 17,
1897; Author.

Isola has not heretofore been known to occur west of Arizona, but for several years I have taken it in Southern California. It has heretofore been known as a Mexican species, having been first taken near Vera Cruz, and only rarely found in Arizona along the Mexican border. The key to the species is the regularly curved row of large spots on underside of fore wing, and the large solitary spot on hind wing.

395. *Lycæna Gyas*.

No figure.

This is apparently another Mexican species, and is named for the male only, and has not been taken since the publication in 1871. The description calls for "A pale violet-blue, immaculate, a fuscous point near anal angle. Under side, brown, washed whitish, a straight row of median spots across fore wing; hind wing with a median row of spots and faint row of marginal spots, of which two near angle are distinct and blackish."

397. *Lycæna Hanno*.

PLATE XXX; Figures 397, a, b.

Fig. 397, Male, Yuma, Arizona, May, 1893; Author.

a, Male, underside, Yuma, Arizona, May, 1893;
Author.

b, Female, underside, Yuma, Arizona, May, 1893;
Author.

This species is somewhat like the preceding, *Isola*, but lacks the prominent row of spots which designates *Isola*, and the spots beneath on hind wing are different; I figure the underside of both the male and the female as the spots near anal angle are different in the sexes, the male having but one, while the female has two or three. These spots, with the absence of prominent spots on fore wing constitute the key to the species. I have taken this pretty little species only at Yuma. It is a Mexican butterfly, and ranges south to Central America, and Yuma is its most northern station.

398. *Lycæna Speciosa*.

No figure.

Speciosa is smaller than *Hanno*, is blue on upper side and on underside of fore wing there is an angulated row of large black spots, while the hind wing has no prominent spots, and only several

inconspicuous ones; no colored lunules, nor any of the usual angle spots on hind wing. *Speciosa* comes from the mountains of Kern County, California.

399. *Lycæna Marina*.

PLATE XXX; Figures 399, b, c.

Fig. 399, Male, Southern California, August 20, 1892; Author.

b, Female, Southern California, August, 1890; Author.

c, Female, underside, Southern California, Nov. 9, 1902; Author.

Marina is not one of the "Spring Blues," for it does not appear until summer, and then it flies till frost, being the only one of all the "blues" to fly so late in the season. *Marina* is fond of feeding on the flowers of the cultivated alfalfa, and the female lays its eggs on the flower buds of alfalfa, and on other leguminous plants; the figure *b* is of a female which was ovipositing on the buds of lathyrus, wild-pea. The egg is pale green, and hatches in from sixteen to eighteen days. The male is especially splendid in changeable colors of brown and blue, in solid effects, but these colors soon fade after the insect is killed.

400. *Lycæna Sissona*, n. s. Not figured elsewhere.

PLATE XXX; Figure 400, Female, Sisson, Cal., July, 1892; Author.

Expanse, .95 inch; color, black-brown, without blue scales at base; no spots except a very obsolete lunule near anal angle of hind wings. Under side gray, with a tint of brown; six discal spots in two sections, six more indefinite marginal; hind wing, two basal, two costal and two discal round black spots; four less distinct oblong spots; a fulvous lunule near anal angle.

This elegant little new species was captured by the Author at Sisson; it is unique; the male is unknown.

401. *Lycæna Astragala*, n. s. Not elsewhere illustrated.

PLATE XXX; Figure 401, Male, San Bernardino, Cal., Aug. 2, 1889; Author.

Expanse, .85 inch; violet-blue; a black spot near anal angle. Under side grayish or dove-color; on fore wing is a cell-bar, a broken discal series of oblong spots, and a double row of dusky

curved marginal lunules; on hind wing are two round black basal spots and a costal one, and nine dark, oblong, wavy spots, corresponding to those on fore wing; at anal angle is a twinned jet-black spot well glossed over with blue-green metallic scales, and above this are two larger round black spots with metallic scales on the outside only.

This male is unique. No female is known. This type was bred by me from the seed-pods of astragalus, which I was manipulating for the larvæ of *Amyntula*, and along with *Amyntula* I got this beautiful new species.

402. *Lycæna Exilis*.

PLATE XXX; Figures 402, b, c.

Fig. 402, Male, San Bernardino, August 12, 1889; Author.

b, Female, San Bernardino, October 20, 1902;
Author.

c, Female, underside, San Bernardino, October 20,
1902; Author.

Exilis is a tropical butterfly, not going north of latitude 35 degrees, or say, to Santa Barbara, thence it extends south through Mexico to Central America. It is a mid-summer species, appearing in July and flying till frost comes. In California *Exilis* has for a larval food-plant *atriplex bracteosa*, a malodorous plant which grows by the roadsides and along the streets in the gutters. *Exilis* and the next species are much alike; the key to *Exilis* is a small white spot in the fringe of fore wings near inner angle.

403. *Lycæna Isophthalma*.

PLATE XXX; Figures 403, b, c.

Fig. 403, Male, Greenhorn Mountains, June, 1888; Author.

b, Female, Greenhorn Mountains, June, 1888;
Author.

c, Female, underside, Greenhorn Mountains, June,
1888; Author.

This little species, the smallest in the world, has not heretofore been known except from Florida and the country bordering on the Gulf of Mexico. It is quite a surprise, therefore, to find it on the top of a mountain 8,000 feet high, in the latitude of California. These examples were taken by myself; at the time of capture I thought that they were *Exilis*, and gave them no particular attention, and only took a few, just for locality identification, for at

that time I had never known *Isophthalma*. This species has not the white space in the fringe of fore wing just above inner angle, and can be separated from *Exilis* in that way.

Considering that *Isophthalma* is a semi-tropical, low-land species, it is probable that upon fuller examination and comparison of a series this Californian alpine form will prove to be a separate species.

Genus PHOLISORA.

404. *Pholisora Catullus*. Erroneously numbered 403 on the plate.

PLATE XXX; Figures 404, a.

Fig. 404, Male, Southern California, no data; Author.

a, Male, underside, Greenhorn Mountains, June, 1888; Author.

This is a common butterfly all over the United States, but I have not met it in the more northern parts of the West Coast. It flies on the plains and to 8,000 feet elevation on the mountains, this figure *a* was taken at 7,000 feet.

406. *Pholisora Libya*.

PLATE XXX; Figures 406, b, c.

Fig. 406, Male, Fish Spring, Mojave Desert, April 8, 1889; Author.

b, Female, Colorado Desert, Lone Palm, May 2, 1889; Author.

c, Female, underside, Colorado Desert, Lone Palm, May 3, 1889; Author.

Libya is a true desert butterfly. In general the deserts are not adapted to butterfly life, and but few are ever seen in a real desert, although several species are found around the borders of the dry and sandy wastes, but *Libya* is an exception, and is oftenest found in the thoroughly desert locations, and seldom found in any less rigorous locality. I observed the females ovipositing on the leaves of *Atriplex canescens*, a small desert shrub, in the Colorado desert, May 2, 1889. *Libya* is reported to be found in some parts of Utah, and presumably may be seen in the intervening regions of Nevada.

407. *Pholisora Alpheus*.

PLATE XXX; Figures 407, b.

Fig. 407, Male, Yuma, Arizona, May, 1887; Author.

b, Female, Yuma, Arizona, May, 1887; Author.

Alpheus is a Mexican species, and only comes into the United States a little along the border. Nothing is known about the preliminary stages of this butterfly; it has but little interest for us as it is scarcely belonging to our territory.

408. *Pholisora Lena*. Not ever previously illustrated anywhere.

PLATE XXX; Figures 408, b, c.

Fig. 408, Male, Northern Arizona, May, 1893; F. Stephens.

b, Female, Central Montana, June 30, 1887; Author.

c, Female, underside, Central Montana, June 30, 1887; Author.

Lena is one of the rarest butterflies of the United States; but few collections have it, and even the Government Museum at Washington has it not. Yet it is not local at all, for these two localities noted above are about 800 miles apart as the bird flies, and doubtless *Lena* can be found in any of the States of the Great Basin. It is not at present known to live in the West Coast States proper, but may very likely be found in Nevada, and along the eastern base of the Sierra Nevadas, and north into Oregon and Washington, east of the Cascades.

Genus COPÆODES.

The species of this genus are all of small size, all similar, one to another, all golden-yellow in color. Formerly these species were all listed in with the *Pamphilas*, but about 1860 Dr. Speyer of Germany separated this group from the *Pamphilas*, on account of the size, the short antennæ, the long fore wings with acute apices, and the triangular shape of hind wing, and the lack of the black discal mark common to all *Pamphilas*.

The sex-mark is, for the male, a short, straight, diagonal line near the middle of fore wing, as shown in Figures 411, 412; in the males of the other species this sex-mark is not visible.

Our fauna contains four species of *Copæodes*.

409. Copæodes Procris.

PLATE XXX; Figures 409, b, c.

Fig. 409, Male, Tucson, Arizona, June, 1887; Author.

b, Female, Santa Rita Mountains, June, 1903;
F. Stephens.c, Female, underside, Tucson, Arizona, June, 1887;
Author.

Procris was first made known in 1870, from specimens taken near Tucson. It is found on the plains and hills and on the mountains to a height of 6,000 feet, as on the Santa Ritas, and the Santa Catalinas. It is quite a warm-blooded little thing, enjoying the hot, dry air of the semi-desert country when the mercury dallies with the 100 mark. Procris is quite local, not going eastward into New Mexico, nor westward towards Yuma, nor to the northward. No one has noted the food-plant, but doubtless it is grass of some sort.

Variety Waco. There is a small-sized form, supposed to be a form of Procris, that has received the name of Waco; it is much smaller, but of about the same color, and with the same lack of distinguishing marks. It has the same habitat as Procris.

411. Copæodes Candida. Not elsewhere illustrated.

PLATE XXX; Figures 411, b, c.

Fig. 411, Male, San Bernardino Valley, August 26, 1897;
Author.b, Female, San Bernardino Valley, August 5, 1895;
Author.c, Female, underside, San Bernardino Valley, April
10, 1896; Author.

This species was first found in 1883, and was published by the Author in 1890, from the female only, as the male was not known at that time, although I had a dozen examples of the female. Candida is a size larger than Procris; the male is darker than any Procris, and has a sex-mark, an angular dash near the middle of fore wings, which Procris has not. The underside of Candida is flushed with orange, as shown on the plate, as Procris never is.

The larval food-plant is cynodon dactylon, "Bermuda grass," a grass not native of California, but introduced about 1880, soon after the completion of the Southern Pacific Railroad to Louisiana, where the grass is common; and soon after the grass became intro-

duced this butterfly first appeared. I do not try to explain these things, I simply state the facts without comment.

412. Copæodes Wrighti.

PLATE XXX; Figures 412, b, c.

Fig. 412, Male, Mojave Desert, June 29, 1881; Author.

b, Female, Mojave Desert, June 29, 1881; Author.

c, Female, underside, Mojave Desert, June 29, 1881; Author.

All these examples figured here were taken by me at the time the species was discovered, twenty-four years ago. I captured eighteen on that day, but have not been back to the locality after more since. I found the butterfly feeding on the flowers of *Bigelovia intricata*, and I thought at the time that it probably was the larval food-plant. Wrighti, male, has the sex-mark, the same as *Candida*. And there is another mark, not heretofore mentioned, that is peculiar, namely, the lighter-colored rays from base to margin, on the underside of hind wing, as shown on the plate, in figure c. These rays are raised above the general surface of the wing, like ribs. The same feature, still more marked, is seen in the figure of *Eunus* following.

413. Copæodes Myrtis.

No figure.

Myrtis is from Arizona, where it is but scantily found. I have never taken one, nor have I one in my cabinet. It is said to greatly resemble *Procris*, but is a little darker. It is probably a Mexican species.

414. Copæodes Eunus. Never previously illustrated.

PLATE XXX; Figures 414, b, c.

Fig. 414, Male, Sierra Nevadas of Southern California, June, 1888; Author.

b, Female, Sierra Nevadas of Southern California, June, 1888; Author.

c, Female, underside, Sierra Nevadas of Southern California, June, 1888; Author.

Eunus is the largest *Copæodes* of the country, and it is very rare as well. In my cabinet there is no male that shows the discal sex-mark, and I think that *Eunus* has not the discal dash, as *Procris* has not. The underside in figure c shows the raised, light-

colored rays very distinctly. Nothing is known as to the preliminary stages, nor as to the food-plant. One cannot know everything; I deem myself fortunate in being able to show you the fine series of figures of the species, it is so rare; and am willing that some one else should name the plant.

Genus PAMPHILA.

The genera in butterflies are all small in the numbers of the species they contain; only Genus Pamphila contains a fair number of names; for it is absurd to think of every species carrying a generic name. Some attempts have been made to divide this genus into many, but there are no manifest lines for such division, and any attempt made has been met by dissent and counter division, and whatever one author may do in the way of genus-dividing is promptly contradicted by the next writer. All this tends to confusion and to the disgust of the student, accomplishing no good whatever, but only harm.

I therefore in this book follow essentially the system of classification of W. H. Edwards, the most competent captain of butterflies that this country has ever seen, and I shall adhere to it until a better one is found, and one competent enough to acquire and retain a following. For this old system has stood the test of time for a century, more or less, and is good for a century to come. Let the Pamphilas stand.

The eggs of the "Skippers" are mostly dome-shaped, or hemispherical, and are laid singly on the proper plants, which are mostly grasses of various kinds. These butterflies will not lay their eggs when in confinement without their proper plant is present.

416. *Pamphila Ruricola*. Not elsewhere illustrated.

PLATE XXX; Figures 416, b, c.

Fig. 416, Male, Sisson, Cal., August 20, 1891; Author.

Se b, Female, Sisson, Cal., August 20, 1891; Author.

c, Female underside, Sisson, Cal., August 20, 1891; Author.

Ruricola is one of the first of California butterflies to be given a name, as it was found and named in 1852; yet although it has

been known for half a century, it has never been figured either in Europe or America up to this day. The type locality is given in the books as Napa County, Cal., but I place no great dependence upon the localities noted in those early days, for usually the name "California" was sufficient to cover a multitude of places. For myself I have never taken a *Ruricola* in Napa County, but have found them further at the north, most of them bear the data Sisson.

417. *Pamphila Juba*. Not elsewhere illustrated.

PLATE XXX; Figures 417, b, c.

Fig. 417, Male, Pasco, Washington, May 10, 1890;
Author.

b, Female, Mt. Shasta, Cal., August, 1891; Author.

c, Female, underside, Mt. Shasta, Cal., August,
1891; Author.

This species, and the next, *Viridis*, are the largest of the Western *Pamphilas*, and they are very robust and vigorous, fond of feeding on flowers, and that is the time to take them, for their flight is very rapid, so that you do not see them until they halt to feed on the blossoms of some favorite plant. There are some differences in the markings on the upper side of the female, but the most prominent species-mark is on the underside of hind wing, the inner third of which is buffy, blank. The square white spots are more or less connected together.

418. *Pamphila Viridis*. Not elsewhere illustrated.

PLATE XXX; Figures 418, b, c.

Fig. 418, Male, Sisson, Cal., August, 1891; Author.

b, Female, Sisson, Cal., August, 1891; Author.

c, Female, underside, Sisson, Cal., August, 1891;
Author.

This is the largest of all the Western *Pamphilas*; it is a mountain species, and not seen on the lowlands at any point. *Viridis* is a shade darker on upper side than *Juba*, and the black discal dash in middle of fore wing is not broken, as it is in *Juba*; and on underside of hind wing the color is greenish; it was on account of this greenish color that *Viridis* was separated from *Juba*. But it seems to me that the broken dash on fore wing is a more important feature, for sometimes the green color is scarcely to be depended upon.

419. *Pamphila Manitoba*.

PLATE XXX; Figures 419, b, c.

Fig. 419, Male, Sierra Nevadas of California, June, 1893; Author.

b, Female, Sierra Nevadas of California, July, 1893; Author.

c, Female, underside, Sierra Nevadas of California, July, 1893; Author.

Manitoba is a high mountain species, usually frequenting heights about 6,000 to 8,000 feet elevation. The female on upper side is very blackish, with distinct spots, contrasting strongly with some which follow, and which are by some writers supposed to belong to the same group, as 420 b and 421 b. On underside of *Manitoba*, on the hind wing, the white spots are pearly-white, and all connected together; this point, and the blackish upperside of the female constitutes the key to the species.

420. *Pamphila Nevada*. Not elsewhere illustrated.

PLATE XXX; Figures 420, b, c.

Fig. 420, Male, Southern California Mountains, June, 1885; Author.

b, Female, Central California Mountains, July, 1892; Author.

c, Female, underside, Central California Mountains, August, 1892; Author.

Nevada is a little smaller than the preceding; the female is even and smooth in colorings and the spots are indistinct, and the spots of the underside are smaller, white, angular, and connected together. This is a high mountain form; the male was taken at an altitude of 5,000 feet, the female at 10,000 feet, and the third at 7,000 feet elevation. The form of spottings on underside of hind wing, combined with the softness of coloring of the female, constitute the determinating points.

421. *Pamphila Colorado*. Not elsewhere illustrated.

PLATE XXX; Figures 421, b, c.

Fig. 421, Male, Pasco, Washington, May, 1890; Author.

b, Female, Sierra Nevadas of Central California, 1892; Author.

c, Female, underside, Greenhorn Mountains, June, 1888; Author.



Colorado is a mountain butterfly, widely scattered over a large territory. The female is variable; this example here figured is a very softly colored one, that does not show the stigma and spots on the upper side so much as some do; the key of the species is the underside of hind wing, it is griseous-green, with white, squarish spots, well connected together except at the angle of the spots where the line of spots is cut above the outer spot.

422. *Pamphila Idaho*. Not elsewhere illustrated.

PLATE XXXI; Figures 422, b, c.

Fig. 422, Male, Helena, Mont., June, 1890; Author.

b, Female, Western Oregon, August, 1892; Author.

c, Female, underside, Western Oregon, August, 1892; Author.

Idaho has essentially the same markings, but of a much lighter color, being a light-yellow both above and beneath; it is called "the yellow Colorado." The spots of underside of hind wing are smaller and less contrasty. In this group the white spots of underside form the best key to the various species, but in this species the clear light-yellow of the male is also a good point.

423. *Pamphila California*, n. s. Not elsewhere illustrated.

PLATE XXXI; Figures 423, b, c.

Fig. 423, Male, Southern California, May 20, 1896;
Author.

b, Female, Southern California, May 20, 1896;
Author.

c, Female, underside, Southern California, May 20, 1896; Author.

Expanse, 1.1 to 1.4 inch; dusky-fulvous; stigma of the male broad, cut; female stigma broken, obsolete, only the apical part present; no spots on hind wing. Underside about the same color as female upper side; three or four indistinct apical points; hind wing darker; a very small silver angular comma, and two to five silver-white spots in a line, not connected except the two outer ones are usually joined together to form one, and one or two or three smaller silver spots, each smaller than the preceding, all in a line at right angles to the body.

I have named this species California, to conform with the system customary in this comma group, and because it is found here in

California. This is the most southern member of the comma group of the West Coast Pamphilas.

424. Pamphila Oregonia. Not elsewhere illustrated.

PLATE XXXI; Figures 424, b, c.

Fig. 424, Male, Tenino, Washington, May, 1891; Author.

b, Female, Northeastern California, 1894; F. Stephens.

c, Female, underside, Sisson, Cal., July, 1891; Author.

Stigma narrow, broadly cut; female stigma scarcely present; the spots on underside of hind wing are not white, hardly light, but are just light enough to be visible. There are no dominant points by which to identify this species, but the most peculiar one is that the dusky apices of the female include the extension of the stigma, so that the stigma itself is not apparent, being obscured by the general duskiess of the wing.

425. Pamphila Sylvanoides.

PLATE XXXI; Figures 425, b, c.

Fig. 425, Male, Truckee, Cal., June, 1892; Author.

b, Female, Lake Tahoe, Cal., June, 1892; Author.

c, Female, underside, "Cala.," no data, from W. H. Edwards, 1886.

Sylvanoides, as I see the species, is the northern form of the species, as Columbia, next following, is the southern, the two being, as I believe, only slightly differing forms of the same species. Compare the two series, 425, b, c, and 426, b, c, and form your own opinion.

The species Sylvanoides can be identified by the curved, almost circular, row of light spots on under side of hind wing; most others are angulated; these spots are never pearly-white, only whitish.

426. Pamphila Columbia. Not elsewhere illustrated.

PLATE XXXI; Figures 426, b, c.

Fig. 426, Male, Southern California, June, 1885; Author.

b, Female, Southern California, June, 1885; Author.

c, Female, underside, Southern California, June, 1885; Author.

Columbia and the preceding, Sylvanoides, are very similar and can scarcely be separated by the upper side; beneath, the chief

point of difference is the color of the spots on hind wing, white in *Sylvanoides*, and yellowish in *Columbia*; the shape of the curve of the spots is the same.

Columbia is very abundant on the mountains of Southern California, flying abundantly on the scantily-forested crests and heights, and represents the more northern species, *Sylvanoides*, although *Sylvanoides* itself is present, but *Columbia* does not go far north.

427. *Pamphila Rhesus*.

No figure.

This is a Mexican species, which comes over the line into Arizona, but I have never seen it, and it has little or no interest for us.

428. *Pamphila Carus*.

No figure.

Carus is another Mexican butterfly, which is occasionally seen in Texas and Southern Arizona.

430. *Pamphila Nemorum*. Not elsewhere illustrated.

PLATE XXXI; Figures 430, b, c.

Fig. 430, Male, Pendleton, Oregon, July, 1891; Author.

b, Female, Sisson, Cal., August, 1891; Author.

c, Female, underside Southern California, May, 1889; Author.

This and the next, *Agricola*, are in some respects similar, but generally, and especially on the underside, in *Nemorum* the colors are more uneven, being both lighter and darker, or contrasty; and there is a difference on the underside of fore wing, the cloudy patch being strong in *Nemorum* and nearly absent in *Agricola*. *Nemorum* is a wide flyer, and covers practically the whole coast.

431. *Pamphila Agricola*. Not elsewhere illustrated.

PLATE XXXI; Figures 431, b, c.

Fig. 431, Male, Greenhorn Mountains, Cal., June, 1888;

Author.

b, Female, Southern California, no data, 1890;

Author.

c, Female, underside, "Washington Terr."; from W. H. Edwards, 1885.

This is a well-known species; was named in France in the early days of California, yet *Agricola* has never before been figured in

any country. Similar to *Nemorum*, but clearer and yellower, especially beneath; there are no spots on underside of hind wing, this being the only *Pamphila* that has no spots, except the next species. This third figure is photographed from a specimen sent me by Mr. Edwards, in the early days before Washington became a State. *Agricola* is a wide-spread species, like *Nemorum*, occupying about the same territory.

432. *Pamphila Milo*. Not elsewhere illustrated.

PLATE XXXI; Figures 432, b, c.

Fig. 432, Male, "Or.," no other data; from W. H. Edwards, 1885.

b, Female, Mt. Tabor, near Portland, May, 1891; Author.

c, Female, underside, Mt. Tabor, near Portland, May, 1891; Author.

This species was separated from *Agricola* by Mr. Edwards in 1883, and in 1885 he sent me the male example here figured, for identification purposes. *Milo* is smaller than *Agricola*, and in general coloration, both on upper and lower sides, is more even, or less contrasty. It has never been found outside of Oregon, that I have ever heard of.

433. *Pamphila Pratincola*.

PLATE XXXI; Figures 433, b, c.

Fig. 433, Male, Tenino, Wash., May, 1891; Author.

b, Female, Sisson, Cal., August, 1891; Author.

c, Female, underside, Pendleton, Oregon, Aug., 1892; Author.

This also is one of the early birds, named by Boisduval in 1852, and never yet figured. *Pratincola* is at once distinguished by the chocolate color on the underside of hind wings; the example figured in the plate is not exceptionally deep colored; the color may be in some degree dependent upon the season, or the elevation. *Pratincola* flies from Northern California through Oregon and Washington, and probably well up into British Columbia.

434. *Pamphila Verus*.

No figure.

This name is set down for Southern California, but I have never seen it, and do not know of any one who has; it seems to be an unknown quantity, hidden away in some obscure spot.

435. *Pamphila Campestris*.

PLATE XXXI; Figures 435, b, c, cc.

Fig. 435, Male, Southern California, March 30, 1896;
Author.b, Female, Southern California, Sept. 22, 1890;
Author.c, Female, underside, Southern California, April 10,
1890; Author.cc, Female, underside, Southern California, Oct. 30,
1892; Author.

Campestris and the Eastern *Huron* are similar, the males of both having the big broad stigma or black spot on middle of fore wing; the female is quite different from the male, the stigma is smaller, and has a translucent spot at the outer end; the figure on the plate tells all about it better than many words could do. Figure *c* is a normal female beneath, being light-colored, and *cc* is a late, autumn species, much darker than at an earlier date.

Campestris is known on the West Coast only in Southern California; it is marked similarly to *Huron*, and by some writers is considered to be the same, but is easily separated by its brighter and more contrasty colors, and because the spots and markings are more definite and positive, while *Huron* is obscure and indefinite in those particulars.

The larval food-plant is *Cynodon dactylon*, Bermuda grass, but it must be able to use other grasses, as it lived in California for years before Bermuda grass came into the country.

437. *Pamphila Brettus*.PLATE XXXI; Figures 437, b, Male and Female; from
H. Strecker.

Brettus is an Eastern species, inhabiting the Atlantic States from New England to Florida. The figures of this pair of *Brettus* are inserted here for comparison with *Brettoides*, next following. *Brettus* does not fly on the West Coast. You see the sexes are widely different in color.

438. *Pamphila Brettoides*. Not elsewhere illustrated.

PLATE XXXI; Figures 438, b, c.

Fig. 438, Male, received, named, but without data; from
Henry Edwards, 1885.

b, Female, Southern California, Sept. 15, 1889;
Author.

c, Female, underside, Southern California, Sept.
15, 1889; Author.

The male was described in 1883 by W. H. Edwards, from two males, one from Texas and the other from Eastern Arizona; the female has never before been described or figured. There is a little valley in Southern California where this species is found; I have taken the pairs in copula many times, and have had the species under observation for many years. It is extremely local. The female *Brettoides*, as shown above, is very different from the male, yet not so widely as in *Brettus*. The female greatly resembles the female *Campestris*, so much so that by the upper side alone you cannot always separate them, but the underside is peculiar, and unlike any other *Pamphila*, the hind wing having six or eight little brown dots on a plain buffy ground, and no light spots at all.

In spring of 1897 I observed a female *Brettoides* ovipositing on rose leaves, and captured it to make sure of the species, as that is a plant unknown as a larval food-plant for *Pamphilas*. If any one else had reported the fact, I should have doubted. Many years ago Mr. W. H. Edwards mentioned *Brettoides* to me, and suggested that I look out for the female, saying that it probably was black, like *Brettus*. But it is now apparent that *Brettoides* has nothing to do with *Brettus*; even the similarity of names cannot tie them together.

440. *Pamphila Sabuleti*.

PLATE XXXI; Figures 440, b, c.

Fig. 440, Male, San Bernardino Valley, June, 1889;
Author.

b, Female, Southern California, Aug. 28, 1890;
Author.

c, Female, underside, Southern California, Aug. 28,
1890; Author.

Sabuleti does not need much description, as it is different from any other, and the figures depict it very well. In Southern California, where *Sabuleti* is most abundant, it is found on lowlands along the grassy banks of streams, frequenting salt-grass flats and alkaline plains, where nothing but salt-grass grows, and where no other butterfly is seen. On this account I conclude that it

breeds on salt-grass, although I have never seen it ovipositing on such grass, but on the contrary have seen it ovipositing on Bermuda grass; yet I believe it uses salt-grass when the better grass is not at hand.

441. *Pamphila Chispa*, n. s. Not elsewhere illustrated.

PLATE XXXI; Figures 441, b, c.

Fig. 441, Male, Sierra Nevadas of Central California,
June, 1892; Author.

b, Female, Sierra Nevadas of Central California,
June, 1892; Author.

c, Female, underside, Sierra Nevadas of Central
California, July 3, 1892; Author.

Expanse, .8 to 1 inch; smallest *Pamphila* of the West Coast; short and broad stigma; wide dusky margins; the markings of the female patterned after *Brettoides*; on under side both wings are dusky, with white markings, those of hind wing connected in an angular band.

This new species is a mountain flyer, living at elevation of 6,000 to 8,000 feet, on scantily forested heights and in little mountain valleys. It is a charming little thing, and I have named it *Chispa*, "a precious little nugget."

442. *Pamphila Vestris*. Not elsewhere illustrated.

PLATE XXXI; Figure 442, Male; from W. H. Edwards,
1885.

This species is set down for the Pacific Coast, in California. I have not seen it during the twenty-five years that I have hunted butterflies, and I very much doubt that it comes here; but it is possible that it does, and so I figure it, for the benefit of some lucky man who may perhaps come upon it unexpectedly. It comes from Florida and Colorado.

443. *Pamphila Bellus*. Not elsewhere illustrated.

PLATE XXXI; Figure 443, Male, Huachuca Mts., Ariz.,
1895; E. R. Kunze.

This black fellow needs but little description in words; black wing, spotless above and beneath, with bronzy gloss on upperside, and with orange fringe.

444. Pamphila Arabus.

No figure.

Arabus is from Arizona; it was named from one female specimen taken in Southern Arizona, probably in 1881, and so far as I know, not seen since. The female is glossy dark brown, with five small translucent spots in fore wing; beneath it is grayish-brown, without spots.

445. Pamphila Nereus. Not elsewhere illustrated.

PLATE XXXI; Figures 445, b, c.

Fig. 445, Male; received from C. F. McGlashan, in 1889.

b, Female, Yuma, Arizona, June, 1890; Author.

c, Female, underside, Yuma, Arizona, June 1890;
Author.

Nereus is brownish-black and has two, or three, or four small white spots on fore wing, and sometimes one or more similar ones on hind wing, though often not any. The spots are more plainly seen on the underside, extending in a straight line across both wings near the middle. It is common enough at Yuma, but does not come further west.

446. Pamphila Deva.

No figure.

Deva is named in the catalogues as inhabiting Arizona and Southern California, and therefore I mention it, although I have never seen it, and do not believe it ever was seen in California; presumably it is a Mexican species that is very limited in its flight on American soil, and I suppose that it was set down to California from guess-work rather than actual knowledge.

447. Pamphila Lunus.

No figure.

This is similar to Deva. Presumably Mexican, and of no interest. It is of very large size, 1.8 inches; dark brown on both upper and undersides, or a little grayish beneath, with a few small translucent spots, and two indefinite black-brown dashes.

448. Pamphila Errans.

No figure.

Expanse, $1\frac{1}{4}$ inch; dark brown, with six small yellowish spots on fore wing, no spots on hind wing; underside a little lighter, and the same spots show. Apparently named from the male, or the sexes may be alike. From Yosemite.

450. *Pamphila Python*. Not elsewhere illustrated.

PLATE XXXII; Figure 479, Male, Santa Rita Mts., Ariz., 1893; F. Stephens.

By unavoidable incident this figure was obliged to be inserted on a plate out of regular order. *Python* is found only in a strip of country along the Mexican line; it is scarcely an American species.

482. *Pamphila Cestus*. Not elsewhere illustrated.

PLATE XXXII; Figure 482, Santa Rita Mountains, 1893; F. Stephens.

This figure is inserted out of regular order. The name is standing among the *Pamphilas*, but I think erroneously, and I include it among the *Pamphilas* under protest.

453. *Pamphila Melane*.

PLATE XXXI; Figures 453, b, c.

Fig. 453, Male, Southern California, 1895; Author.

b, Female, Greenhorn Mountains, June, 1888; Author.

c, Female, underside, San Bernardino, Cal., 1899; Author.

This fine large *Pamphila* was named in 1869, after which it was not seen for sixteen years, and the species was thought to be "lost," but in 1885 it was rediscovered by the Author, and it was then accounted to be a dimorphic female of *Campestris*, but after effort to establish the male sex, during which investigation it was dissected by Dr. Scudder, it was at length placed in its proper position. Since these early days the species has spread over the whole of the south end of the State, and has become quite common.

The egg is white, sub-globose, smooth, and is oviposited on Bermuda grass, but there must be some other food-plant, for the butterfly was found before the late-coming Bermuda grass became introduced into California about 1880.

Geus *AMBLYSCIRTES*.

454. *Amblyscirtes Simius*.

PLATE XXXI; Figures 454, b, Male and Female, underside, Arizona.

There are no species belonging to this genus on the Pacific Coast proper. These two species are figured here because they are

Arizona forms and therefore really belong to the West Coast fauna, but more to show what these foreign species look like, for comparison. *Simius* is found in Colorado also. The sexes of the species in this genus look much alike, and these two forms will suffice.

455. *Amblyscirtes* Nanno.

PLATE XXXI; Figure 455, Male, from Arizona.

This species in the shape of the wings and in color looks like some other genus, and has, I believe, been classed elsewhere, but is now included in the Genus *Amblyscirtes*. It is found only in Arizona.

Genus PYRGUS.

456. *Pyrgus Ericetorum*. Not elsewhere illustrated.

PLATE XXXI; Figures 456, b, c.

Fig. 456, Male, Southern California, April 20, 1889; Author.

b, Female, Southern California, July, 1903; Author.

c, Female, underside, Southern California, June, 1889; Author.

This is an old species, named in 1852, but is yet quite scarce and little known. It is fairly widely spread; its flight is rapid, and it cannot be taken on the wing, but can be caught when at water, or when hovering about the food-plant. The plant is *Malvastrum thurberi*, a tall and slender bush, bearing lavender blossoms that appear sometimes before the leaves are seen. The egg is white, globular, and laid on the young leaves. I have noted the ovipositing of the egg in November.

457. *Pyrgus Tessellata*. Not elsewhere illustrated.

PLATE XXXI; Figures 457, b, c.

Fig. 457, Male, Southern California, May, 1889; Author.

b, Female, San Joaquin Valley, June, 1888; Author.

c, Female, underside, San Bernardino, July 20, 1895; Author.

This little skipper, published in 1872, has never been figured, except a wood-cut by French, of the male. *Tessellata* flies over the whole United States, except New England, and the States of Oregon, Washington, and Idaho, where *Cæspitalis* appears to take



its place, as I have not ever taken *Tessellata* in either of those States. It flies all the season through, early and late, living closely up to the frost line in spring and in autumn.

The larval food-plant is *Malva rotundifolia*. The egg, like those of most skippers, is nearly globular, light-green in color, and is oviposited on the leaf-buds.

458. *Pyrgus Cæspitalis*.

PLATE XXXI; Figures 458, b, c.

Fig. 458, Male, "Mendocino," no further data; W. H. Edwards, 1886.

b, Female, Donner Lake, Cal., June 25, 1891;
Author.

c, Female, underside, Tehachapi Mountains, June
10, 1900; Author.

This is rather a northern species. I have not met it further south than the Tehachapi Mountains, and in the Northern States of the West Coast it is abundant. Especially near Portland, Mt. Tabor used to be full of them. I have taken it in Eastern Washington at Ellensburg.

459. *Pyrgus Scriptura*.

PLATE XXXI; Figure 459, Male, Yuma, Arizona, May, 1899; Author.

This little species is one of the rare things of our fauna; it is not common anywhere, or if it is, then I have never found that place. In fact, I think it is one of the most rare butterflies of the whole list, for this specimen here figured is the only one I have ever captured during twenty-five years' search. Possibly in Mexico it may be more common, although at Mazatlan, and in the mountains of the interior of Mexico, I have found *Tessellata*, but not *Scriptura*.

Genus NISONIADES.

This is a genus of thick-bodied and stout-winged butterflies of universal occurrence, dusky and unhandsome, and difficult to handle when captured. This group is at present in an unsatisfactory state, and needs revision, by a competent hand; if the hand be not competent, it is better as it is.

461. *Nisoniades Perseus*.

afraivus?
 PLATE XXXII; Figure 461, Male, San Bernardino Mts.,
 July, 1899; Author.

This butterfly is found flying on the plains and also on the mountains of moderate height; one of the most common species, and a voracious feeder on flowers, seemingly always hungry, and never satisfied. It is common all over the United States west of the Rocky Mountains.

The food-plant is said to be willow, but there must be some other plant as well.

462. *Nisoniades Juvenalis*.

propeertius?
 PLATE XXXII; Figure 462, Female, Lake County, Cal.,
 June 20, 1894; Author.

This species is common at the East, but is more rare on the West Coast, being occasionally met with in the southern parts, but not present in the more northern portion of the Coast States.

The food-plants are the leguminous or pod-bearing plants.

463. *Nisoniades Propeertius*. Not elsewhere illustrated.

PLATE XXXII; Figure 463, Male, San Bernardino Valley,
 1903; Author.

This is sometimes considered to be the Western form of the Eastern *Juvenalis*; it is one of the most uninteresting species, and is usually not taken when it is met with, and so the localities are not well filled out; at present it is credited only to California and Vancouver Island, but doubtless inhabits Oregon and Washington as well.

464. *Nisoniades Clitus*.

funeralis?
 PLATE XXXII; Figure 464, Female, Southern California,
 June, 1891; Author.

Clitus is a strong-flying and active butterfly, and is usually taken while feeding on flowers, as it is difficult to catch while in flight. It is a southern species, and is not found north of the Tehachapi Mountains. The chief feature of this species is the wide white fringe to hind wings.

468. Nisoniades Funeralis.

PLATE XXXII; Figure 468, Female, San Bernardino Valley; Author.

This is more brownish and less black than Clitus; it has a wide white fringe to the hind wings, but it is not quite so marked as in Clitus. This also is a southern form, and found only in California and Arizona.

469. Nisoniades Tristis. Not elsewhere illustrated.

PLATE XXXII; Figure 469, Female, Central California, 1894; Author.

Tristis is the most abundant species of all the numbers of this sad group; I have taken it from Spokane to the Mexican line, and it seems to occupy the plains and the mountains, everywhere present.

The food-plant is Hosackia.

470. Nisoniades Tibullus.

No figure.

This name is given in the catalogues as inhabiting California, but it is unknown to me.

480. Nisoniades Lacustra, n. s. Not elsewhere illustrated.

PLATE XXXII; Figure 480, a.

Fig. 480, Male, Blue Lakes, California, May 10, 1894; Author.

a, Male, underside, Blue Lakes, California, May 10, 1894; Author.

Expanse, 1.15 inches; fore wings blackish, crossed by an extra-discal black line, outside of which is a line of small points; hind wings dark brown; a few indistinct light points sub-marginal. Underside blackish, both wings alike in color; a series of light points sub-marginal on hind wing.

The fine black lines across fore wing are peculiar, and are not seen in any other West Coast species. I was compelled to place this figure on the plate out of its proper order.

Genus EUDAMUS.

471. *Eudamus Pylades*.

PLATE XXXII; Figure 471, Female, Santa Rita Mountains, 1903; Stephens.

Pylades is an Eastern species, and only appears within Western territory in the torrid mountains of Southern Arizona.

472. *Eudamus Mexicana*.

PLATE XXXII; Figure 472, Female, Sierra Nevadas of California, 1891; Author.

This species was once thought to be a dwarfed variety of the preceding, *Pylades*, but at present is conceded to be a separate species, though there is not much apparent difference, except in size; but the habitat of the two forms is vastly different, the latter being a high mountain form, of the cooler, coast region.

474. *Eudamus Tityrus*.

PLATE XXXII; Figure 474, Female, San Bernardino Mountains; Author.

I figure the underside of the female, as the marks are more distinct and peculiar than on the upper side. This strongly marked form is found over the most parts of North America, and flies in South America as well. The egg is laid on the leaves of leguminous plants.

477. *Eudamus Caicus*.

PLATE XXXII; Figure 477, Female, "Arizona"; H. K. Morrison, 1886.

This species is a Mexican bird, and comes not west of Tucson. It has a wide white fringe to hind wings.

478. *Eudamus Æmilia*.

PLATE XXXII; Figure 478, Male, Tehachapi Mountains, June 10, 1891; Author.

This rather peculiar form is found in the Klamath Valley of Oregon and California, and south to the locality noted above, which is the most southern point yet noted.

Genus PYRRHOPYGA.**481. *Pyrrhopyga Araxes*.**

PLATE XXXII; Figure 481, Female, Southern Arizona,
1903; Stephens.

This *Araxes* was taken in the Santa Rita Mountains near Tucson, in July, I believe, at an estimated altitude of 5,000 feet. It is another Mexican species, and comes not west of the mountains where this one was taken.

Genus MEGATHYMUS.**483. *Megathymus Neumœgeni*.**

PLATE XXXII; Figure 483, Female, Southern California,
July, 1903; Stephens.

This *Megathymus* is not previously noted as coming from any locality but Arizona, but it has been taken for several seasons along the border of the Colorado Desert in California, where the larvæ feed upon the pith inside the stems of *Yucca Deserti*.

The eggs of *Megathymus* and of *Pyrrhopyga* are pitted or indented like a thimble.

APPENDIX

DAY-FLYING MOTHS

485. *Hemileuca Nevadensis*. Elsewhere illustrated only by Stretch, the Author of the species.

PLATE XXXII; Figure 485, Male, Dayton, Nevada, August, 1872.

Figure 485 is a photograph of the uncolored lithographic figure by Mr. Stretch, the Author of *Nevadensis*, issued in 1872. I copy as follows from the text: "Both wings in *Nevadensis* are black and pale yellowish; the discal lunule of fore wing is transverse, long and narrow, surrounded by a blackish halo, with a whitish transverse center; hind wings, discal spot dusky, small, with whitish transverse center. Described from two males taken at Dayton, Nevada, in August. Though apparently not rare in Nevada, this insect has not been detected in California." (*Zygænidæ* and *Bombycidæ* of North America, by R. H. Stretch, Parts 1 to 9, 1872 to 1873. Plate 4, page 108.) The discovery of *Nevadensis* is not dated exactly, but it must have been in 1872, I think. *Californica* was first seen by me in 1873, though not collected for distribution till a few years later.

In comparing these different forms, it should be borne in mind that my figure of *Nevadensis* is copied from an uncolored lithograph, and so the wings are represented as being white; while the text describes the color as "yellowish." *Nevadensis* is yellowish, and *Californica* is white.

486. *Hemileuca Californica*.

PLATE XXXII; Figures 486, b.

Fig. 486, Male, San Bernardino, Cal., November 5, 1889; Author.

b, Female, San Bernardino, Cal., November 20, 1903; Author.

This is a local form, flying in October and November. When I first discovered *Californica*, in 1873, I was not then ac-



quainted with *Nevadensis*, but took it for granted that *Californica* was *Nevadensis*, and sent it out as such; later, when I came to see the figure of *Nevadensis* as herewith presented, I noted the difference, and published the *Californian* form as *Californica*, giving at the same time a full life history, in the *Canadian Entomologist*. The form *Nevadensis* has always been practically unknown, and is to this day; the publication in which *Nevadensis* was christened had very small circulation, and is today out of print and well-nigh unknown. Chiefly on account of my having sent out *Californica* as *Nevadensis*, a confusion has arisen, the real *Nevadensis* being unknown. These figures and this text will, I hope, set the matter straight.

487. *Hemileuca Electra*.

PLATE XXXII; Figures 487, b, a.

Fig. 487, Male, Southern California; Author.

b, Female, Southern California; Author.

c, Male, underside, Southern California; Author.

The figures given herewith are good illustrations of this fine *Hemileuca*. The first specimen I ever saw was flying, and I followed it desperately until I caught it, for I recognized it as something new; and from that day to this, although I have acquired a few examples in one way or another, I have not seen another specimen on the wing, nor do I now know the food-plant. That first one that I saw was evidently out of its latitude, for I could not ever find another in that place, and it appears probable that the home of the species is nearer the sea coast. The first one was taken about eighty miles from the sea, in the valley of the Santa Ana River.

Later, I have received information from Mrs. Brandegee, of San Diego, that the larval food-plant of *Electra* is *Erigonun fasciculatum*, popularly known as "wild buckwheat," a shrubby plant which grows about three or four feet high, and which is abundant everywhere, both on the coast and in the valleys of the interior.

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